University of Alberta

An examination of the effects of hospital restructuring on nurses: How emotionally intelligent leadership styles mitigate these effects

by

Greta Gesina Cummings

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of *Doctor of Philosophy*

Faculty of Nursing

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Friday, September 19, 2003

University of Alberta

Faculty of Graduate Studies and Research

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled **An examination of the effects of hospital restructuring on nurses: How emotionally intelligent leadership styles mitigate these effects** submitted by **Greta Cummings** in partial fulfillment of the requirements for the degree of **Doctor of Philosophy**.

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September 8, 2003

Dedication

To my family: Garnet, for thoughtfully, kindly and wonderfully caring about me, my beliefs and motivations to do this work, that I continually felt loved and supported; and Kristin, for giving me time and for doing your homework with me when I was doing mine.

To the late Dr. Arthur C. Custance M.A. (Hebrew, Greek, and Cuneiform, University of Toronto), PhD Education (University of Ottawa), who 30 years ago, saw in me some potential to be a researcher.

Abstract

The overall aim of this research was to determine how the multiple episodes of hospital restructuring in the 1990s in Alberta, Canada, which had led to the layoff of thousands of nurses, affected nurses who remained employed. Given the assumption that the restructuring of hospitals will continue in one form or another due to ongoing fiscal challenges and healthcare reform initiatives, it is important to find ways to mitigate these effects. In this research, I focused on whether and how the leadership styles of nursing leaders, as perceived by the nurses, mitigated or intensified the effects of hospital restructuring on nurses.

This doctoral research was comprised of three empirical studies, each of which led to a manuscript for publication. The first study of this thesis was a systematic review of the research literature on the effects of hospital restructuring including layoffs, on individual nurses who remained employed. In this second study, I examined each of three published factor-analytic models claiming to measure the construct of the nursing practice environment, and focused my discussion on the theoretical and measurement implications of choosing either factor analysis or structural equation modeling as a research method. The third study was an examination of the impact of emotionally intelligent leadership styles as defined by Daniel Goleman, on the effects of hospital restructuring on nurses. A fourth manuscript was developed representing a beginning *theory of mitigation*, which may guide the initial developmental phase of a future research program in leadership science.

The combined findings of the papers in this thesis illustrate that hospital restructuring that included layoffs, had some significant negative physical and emotional health effects on nurses who remained employed. Dissonant leadership styles intensified many of these effects of hospital restructuring on nurses. Resonant leadership styles mitigated many of the effects on nurses and are necessary to ensure healthy nursing staff and to help rebuild healthy nursing practice environments. My findings suggest that by investing energy into relationships with their nurses, resonant nursing leaders not only positively affect the health and well being of their nurses, but also ultimately, the outcomes for patients.

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The effects of hospital restructuring on nurses: How emotionally intelligent leadership mitigates these effects

Introduction & Overview

This thesis represents the output of a comprehensive doctoral program of education and research. The overall aim of this research was to determine how the multiple episodes of hospital restructuring in the 1990s in Alberta, Canada, which had led to the layoff of thousands of nurses, affected nurses who remained employed. Given the assumption that the restructuring of hospitals will continue in one form or another due to ongoing fiscal challenges and healthcare reform initiatives, it is important to find ways to mitigate these effects. In this research, I focused on whether and how the leadership styles of nursing leaders, as perceived by the nurses, mitigated or intensified the effects of hospital restructuring on nurses.

Context of Hospital Restructuring in Alberta

Alberta participated in and often led many forms of hospital restructuring that were similar to other jurisdictions in North America. Norrish and Rundall have documented these different types of hospital restructuring as the three waves of hospital restructuring[1]. I experienced and managed many episodes of hospital restructuring that included nursing layoffs, while working as a senior administrator at several large tertiary care hospitals in Edmonton, Alberta throughout the 1980s and 1990s. With first hand knowledge of the impetus, context and outcomes of each episode, the research of Norrish and Rundall resonated with my experience.

In the 1980's, the University of Alberta Hospitals implemented *primary nursing* by eliminating licensed practical nurse and nursing aide positions through attrition. Only registered nurses were assigned to care for patients in an effort to make more effective use of the professional nursing resources and to increase nursing accountability for the outcomes of care. By the end of the 1980's, *shared governance* had been introduced as a means of sharing the greater decisions of the nursing division within the hospitals (allocation of resources, professional practice models, nursing education, and monitoring of nursing care quality) with the front line nurses as a cohort through their bargaining representative, the nursing union. Both of these initiatives (primary

nursing care and shared governance) proved to be too costly over the ensuing years, and on Monday, November 5, 1990, the first round of layoffs was implemented to meet the first of many fiscal challenges to come. Several hundred nursing positions were eliminated — a combination of nursing support areas beginning with nursing management, education, research, evening and weekend supervision, specialized clinical team support, and eventually front line nurses from every nursing unit.

Within a few years, the second wave of hospital restructuring hit in which major programmatic efficiencies were sought by eliminating departmental boundaries and integrating staff from all disciplines into patient service teams (Monday, June 7, 1993)[2]. The impetus for implementing this major organizational initiative of *Patient Focused Care* had been to realign as many clinical and support resources to the patient care areas as possible. However it began with the layoff of numerous department directors and front line staff from nursing and all other disciplines, and led to the blurring of disciplinary practice boundaries and identities.

Widespread reduction in nursing positions was a central feature of the third wave of hospital restructuring. Since the non-front-line areas and departments had already been downsized in previous episodes of budget cuts, there were only front-line patient care areas left. While some organizations in Alberta had managed this reduction through graduated attrition, many were forced to layoff large numbers of nurses in short time periods to meet reduced fiscal targets. In 1995, Alberta was the second Canadian province to redesign the governance structures for all health sectors within the province, creating 17 health regions (governed by Regional Health Authorities) to replace 283 hospital and community health boards. Shortly after came a complete reorganization of the administrative infrastructure and processes in each of the new regional health authorities. Regional planning efforts targeted the consolidation of services to gain efficiencies. Some major health facilities closed while others were reduced to community health centers. The provincial healthcare budget was reduced by 12.2% over three years and reportedly 3,100 nurses were laid off[3].

Throughout the past two decades, the literature has shown the efforts of researchers interested in determining the effects of hospital restructuring on costs, patients, programs, and healthcare staff. Research into the outcomes of implementing patient-focused or patient-centered care models showed that some goals were achieved, but generally results were mixed[4,5,6,7,8,9,10]. In 1998, Alberta participated in the *Canadian Nurse Survey*, our national

contribution to the *International Hospital Outcomes Study*, a five-country consortium of researchers, led by Dr. Linda Aiken from the University of Pennsylvania. The principal investigator for Alberta was Dr. Phyllis Giovannetti, Faculty of Nursing, University of Alberta. The survey reported on various organizational attributes (including the amount of local restructuring), and the state of Alberta nurses' physical and emotional well-being[11]. The theoretical framework underlying that research was that changes to the organizational structure and practice environment affect nurse outcomes measured by burnout, needle sticks, workplace violence and job satisfaction, which further affect patient outcomes measured in morbidity and mortality rates, failure to rescue and adverse events[11].

Impetus For This Doctoral Research

My motivation for conducting this doctoral research was based on my knowledge and experience in managing multiple episodes of hospital restructuring at several large teaching hospitals between 1990 and 1997, each of which resulted in the layoff of healthcare staff, primarily nurses. The implementation of a variety of strategies to meet fiscal or quality targets was the stimulus for each episode. During those years in which I served as a senior nursing and patient care administrator, I served layoff notices to nurses and other health professionals that resulted in well over 1,000 position changes. While the underlying rationale for each restructuring episode was positively idealized as being for the greater good of the organization and its mission to deliver quality patient care within fiscal constraints, the process of delivering bad news to each individual never ceased to be personally troubling. It was important for me to determine the impact of these multiple rounds of layoffs on nurses. I was not able to access nurses who were laid off and never recalled, therefore I focused my research on nurses who remained employed and who responded to the 1998 *Canadian Nurse Survey*, the Canadian portion of the *International Hospital Outcomes Study*[12].

Research questions

Four research questions guided this work.

1. *What are the known effects of hospital restructuring that included layoffs, on nurses who remained employed?*

2. *What are the theoretical and measurement implications of using different research methods to study the concept of restructured nursing practice environment?*

3. *To what extent do leadership styles mitigate the effects of hospital restructuring on nurses?*

4. *What is the mechanism by which resonant leaders mitigate the effects of hospital restructuring?*

Design

This doctoral research was comprised of three empirical studies, each of which led to a manuscript for publication. A fourth manuscript, which presents a beginning *theory of mitigation,* was not written for immediate publication, but will guide the initial developmental phases of a future research program in leadership science.

Study 1: Systematic review of the research literature

Researchers have been studying the ramifications of widespread hospital restructuring and layoffs to staff recruitment and retention, trust and commitment, clinical team and management/staff relations, organizational culture and clinical work environments in a variety of countries[12,13]. The first study of this thesis was a systematic review of the research literature on the effects of hospital restructuring including layoffs, on individual nurses who remained employed[14].

Study 2: A comparative methodological examination of factoral design and causal analysis, both involving secondary analysis of the 1998 Canadian Nurse Survey data.

The examination of restructured nursing practice environments has been a major focus in the research literature; however the research methods have relied heavily on data-reduction techniques such as factor analysis[15,16,17]. I was interested in using a research method that would allow me to develop and test a theory about healthy practice environments such that causal theoretical assertions could be estimated and tested against the data. In this second study, I examined each of the three published factor-analytic models claiming to measure the construct of the nursing practice environment[15,16,17], and focused my discussion on the theoretical and measurement implications of choosing either factor analysis or structural equation modeling as a research method[18].

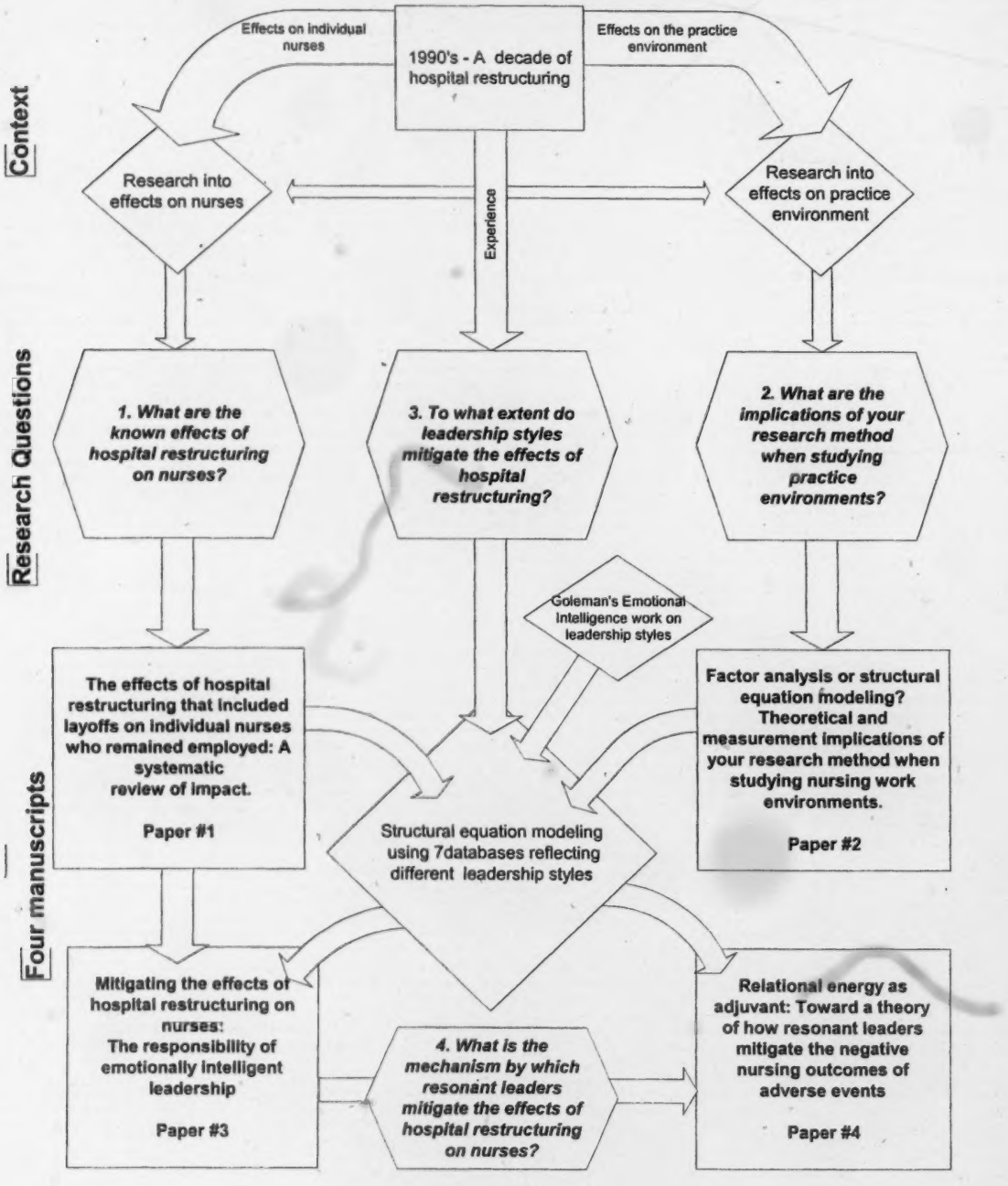
Study 3: Secondary analysis of the 1998 Alberta Nurse Survey database, using structural equation modeling to test a theoretical

model of the effects of hospital restructuring on nurses who worked for leaders with resonant, dissonant or mixed leadership styles.

The third study was an examination of the impact of resonant and dissonant leadership styles as defined by Daniel Goleman[19], on the effects of hospital restructuring on nurses. Resonant leadership styles mitigated these effects, while dissonant styles intensified them[20].

Figure 1 illustrates the relationships between the context of major hospital restructuring that led to the research questions, the three research studies and the four papers flowing from this research. The first two studies, the systematic review and the methodological examination along with leadership theory founded on emotional intelligence, formed the foundation for the third study on the mitigation of hospital restructuring effects by specific leadership styles. A fourth paper arising from this third study articulates a potential theory of the mechanism of mitigation by nursing leaders. Together, these three studies and four papers constitute a thesis that forms the basis for an ongoing and future program of research into leadership science investigating the impact that leadership has on nursing and patient outcomes.

Figure 1: Overview of Cummings Research into the Effects of Hospital Restructuring on Nurses


Context
Effects on individual nurses
1990's - A decade of hospital restructuring
Effects on the practice environment
Research into effects on nurses
Experience
Research into effects on practice environment
Research Questions
1. What are the known effects of hospital restructuring on nurses?
3. To what extent do leadership styles mitigate the effects of hospital restructuring?
2. What are the implications of your research method when studying practice environments?
Goleman's Emotional Intelligence work on leadership styles
Four manuscripts
The effects of hospital restructuring that included layoffs on individual nurses who remained employed: A systematic review of impact.
Paper #1
Structural equation modeling using 7databases reflecting different leadership styles
Factor analysis or structural equation modeling? Theoretical and measurement implications of your research method when studying nursing work environments.
Paper #2
Mitigating the effects of hospital restructuring on nurses: The responsibility of emotionally intelligent leadership
Paper #3
4. What is the mechanism by which resonant leaders mitigate the effects of hospital restructuring on nurses?
Relational energy as adjuvant: Toward a theory of how resonant leaders mitigate the negative nursing outcomes of adverse events
Paper #4

Methods

Survey

A secondary analysis of the *Canadian Nurse Survey* sample was used for the second and third studies with the permission of Dr. Phyllis Giovannetti, principal investigator. This survey was drawn from nurses working in acute care hospitals in Alberta, Ontario and British Columbia. Only the Alberta portion of the *Canadian Nurse Survey* was used for the third study because it was the only province that asked specific questions relating to local hos

pital restructuring, such as how many times each nurse had been laid off, and how many times each was required to change nursing units as a result of hospital restructuring.

Sample

In each province, nurses were accessed through their professional regulatory bodies using annual mandatory reporting information. In Alberta, all registered nurses working in an acute care hospital were invited to participate. In British Columbia and Ontario, a random sample of 100 nurses from each hospital with more than 120 and 100 nurses respectively and all nurses from hospitals with less than 120 and 100 nurses respectively were invited to participate. The final sample of 17,965 (Alberta, 6526, 53%; Ontario, 8778, 57%; British Columbia, 2661, 49%) nurses represented 415 hospitals[16].

Study #1 – The method used was a systematic review of the research literature.

Study #2 & #3 – The method used was testing a theoretical model using structural equation modeling and data from the Canadian Nurse Survey.

Results - Four papers constituting this thesis

Paper #1: The effects of hospital restructuring that included layoffs on individual nurses who remain employed: A systematic review of impact.

It was not possible to retrospectively examine the effects of the

multiple rounds of hospital restructuring on the nurses of Alberta to address the first research question (*What are the known effects of hospital restructuring that included layoffs on nurses who remained employed?*). Therefore, I began my research by conducting a systematic review of the research literature to determine the effects of hospital restructuring that included layoffs, on nurses. No such systematic review had been found in the literature. The review process included examining 1203 search titles and abstracts, and selecting and screening 84 articles using inclusion criteria of hospital restructuring resulting in layoffs, effects on nurses, and research. Next, data were extracted and analyzed from 22 papers that formed the final group of included studies — 18 quantitative and 4 qualitative papers. Using basic content analysis, findings were sorted into four outcome categories — 1) effects of hospital restructuring on nurses' physical and psychological health, 2) effects on nursing job and career satisfaction, 3) effects on nursing roles and patient care, and 4) effects on relationships with colleagues.

Findings. The main effects of hospital restructuring on nurses were a significant decrease in job satisfaction, increase in turnover, reduction in professional efficacy and ability to provide quality care, negative physical and psychological health effects and disruption to health care team relationships. Nurses with fewer years of experience or who experienced multiple episodes of restructuring reported greater effects. Other findings remained inconclusive. Further research was identified as being required in order to determine if these effects were temporal or could be mitigated by individual or organizational strategies.

The *Journal of the American Medical Association* positively reviewed this first paper, authored by Cummings and Estabrooks, however it did not fit its publication themes. It is published in the *International Journal of Sociology and Social Policy* in response to an invitation to submit a manuscript for their special issue on hospital restructuring[14].

Paper #2: Factor Analysis or structural equation modeling? The theoretical and measurement implications of your research method when studying nursing practice environments.

A methodological examination of current research into nursing work environments, contrasting two methods was undertaken to address the research question — *What are the theoretical and measurement implications of using different research methods to study the concept of the nursing practice environment?*

The Revised Nursing Work Index (NWI-R) is a survey scale, based on earlier magnet hospital research[21,22], that is used today to measure nursing work environments[15]. Four conceptually derived subscales[15], five empirically derived subscales[17] and a single factor solution[16] have all been reported for the NWI-R in the literature. No studies were found in which structural equation modeling was used to study nursing practice environments. In this second study, I examined the models underlying these three factoral perspectives on the NWI-R using structural equation modeling and the Canadian Nurse Survey database[11]. I developed an alternative model based on theoretical assertions about healthy hospital nursing workplaces and estimated it as a structural equation model using the same data.

Findings. The published factor analytic models failed significantly, questioning their claims to measure, adequately and appropriately, the nursing practice environment. Although the structural equation model also failed, its diagnostics showed a much closer fit of its theoretical assertions to the data. Important measurement and theoretical issues arising from the comparison of these methods are discussed. The second paper in this thesis, authored by Cummings, Hayduk and Estabrooks, was submitted February 2003 to *Research in Nursing and Health* and is currently in review for publication[18].

Paper #3: Mitigating the effects of hospital restructuring on nurses: The responsibility of emotionally intelligent leadership.

Most research into leadership can be classified into one of four categories; trait, behavioural, power-influence and situational approaches. Trait approaches often focus on personality, emotional control, integrity, motivations, values and other features attributable to individual persons who are often deemed to be *born* leaders. Behavioural approaches consider the nature of the leader's role and the behaviour that distinguishes effective and ineffective leaders. Behavioural studies suggest that the leader can be both task and relationship focused, and can be taught to exhibit leadership

behaviours. Recent publications about emotional intelligence (EI) suggest that EI may reside within both the trait and behavioural approaches. Emotionally intelligent leaders focus on managing their own emotions and their relationships with others.

Daniel Goleman has written extensively on emotional intelligence [19,23,24,25,26] and recently asserted that while leadership includes analytic intelligence, task completion, and organizational skills, to be successful, its primary role must extend to understanding and effectively responding to both their own and other people's emotions[19]. Essentially, he claimed that the most effective leaders were those with high emotional intelligence (EI), namely those whose resonant leadership styles reflected the art of hearing their workers' negative feelings yet responding by positively impacting their mood and propelling them toward optimism and inspiration, even during times of difficulty. In times of change, and even chaos, when work is increasingly emotionally demanding, an effective leader needs to be more empathic and supportive, and demonstrate a wide range of EI competencies[19]. Empathy, or the ability to comprehend another's feelings and to re-experience them oneself, has been reported to be a central component of EI[27] and the key to successful resonant leadership[19]. Empathic leaders are attuned to a wide range of emotional signals, allowing them to sense the felt, but unspoken, emotions in another person or group[19,28,29].

This study sought to determine the extent to which resonant leadership styles, as perceived by nurses working for those nursing leaders, mitigated the detrimental effects of hospital restructuring.

I developed a theoretical model of causal relationships between hospital restructuring and nurses' work and health based on the findings of the systematic review (paper #1). Causal variables included hospital restructuring events, being laid off, changing units, years worked in the hospital, part time/fulltime status, and age. Outcome variables included unmet patient care needs, freedom to make patient care decisions, professional efficacy, emotional and physical health, teamwork with physicians and other nurses, job mobility options, satisfaction and security, intent to quit and satisfaction with supervision, financial rewards, and time to spend with patients.

In order to test the impact of leadership styles on the effects of hospital restructuring on nurses, six databases were created from the *Alberta Nurse Survey* data, each reflecting one of Goleman's leadership styles. Four styles (visionary, coaching, affiliative and democratic) had been described as resonant; with two described as dissonant (pacesetting and commanding). A seventh database was created from all remaining cases that fell neither into the resonant nor dissonant databases (mixed leadership styles). Thirteen leadership competencies, based on Goleman's framework of emotional intelligence (EI)[19], were used to distinguish between these leadership styles and to create one database for each style. The theoretical model was then estimated as a structural equation model using the data for each style.

Findings. Nurses who worked for dissonant leaders reported significantly more emotional exhaustion and psychosomatic symptoms, poorer levels of emotional health, decreased workgroup collaboration and teamwork with physicians, decreased satisfaction with supervision and their job, and greater unmet patient care needs, than did nurses who worked for resonant leaders. Despite experiencing relatively similar hospital restructuring events, nurses who worked for resonant leaders experienced significantly fewer negative effects of hospital restructuring, than those who worked for dissonant leaders. Resonant leadership styles mitigated the effects of hospital restructuring on nurses.

These findings have implications for the recruitment, training and accountability expectations for hospital leaders and for the development of practice environments, health and retention of nurses and ultimately patient care outcomes.

This third paper, authored by Cummings, Hayduk and Estabrooks was submitted July 2003 to *Leadership Quarterly* and is currently under review for publication[20].

Paper #4: Relational energy as adjuvant: Toward a theory of how resonant leaders mitigate the negative nursing outcomes of adverse events

Although the research into the effects of hospital restructuring is still relatively new (within the recent decade), the theory surrounding

how leaders can mitigate the effects of hospital restructuring on their nurses is truly still in its infancy. This paper focuses on one theoretical explanation of the mechanism through which the mitigation process by resonant nursing leaders occurs. This theory hypothesizes that the difference in results for nurses who work for resonant and dissonant leaders is based on the relational energy that the resonant leader invests in building and maintaining relationships with nurses. The resonant leader's actions to invest relational energy to develop and maintain relationships acts as an adjuvant to stimulate the nurse's coping (immune) system by assisting in the development of a new coherence of meaning that serves to reduce the nurse's work related stress. The nurse's emotional resilience grows, allowing him/her to focus on meeting the patient's needs despite the ongoing changes in the work environment.

This paper documents my attempts to theoretically break out of my routine thinking up to this point and to preserve this liberation, whether I specifically use it in the future, or not. Considerable work to further develop this beginning theory would be required, as well as, to examine competing theories – both theoretically and empirically.

Conclusion

The combined findings of the papers in this thesis illustrate that hospital restructuring that included widespread layoffs, had significant negative physical and emotional health effects on nurses who remained employed. Dissonant leadership styles intensified many of these effects of hospital restructuring on nurses. Resonant leadership styles mitigated many of the effects on nurses and are necessary to ensure healthy nursing staff and positive patient outcomes.

Contribution to Nursing and Leadership Knowledge

This thesis has contributed new knowledge to several theoretical and research domains within Nursing and Leadership.

Nursing Theory & Research

The confirmation of what many have believed intuitively, has proven significant; that hospital restructuring had negative effects on

individual nurse's physical and emotional health. This is particularly important, as efforts to recruit and retain nurses are paramount in the current times of nursing shortage and ongoing health care reform. (Paper #1, Paper #3).

Conceptualization & Measurement of the Nursing Practice Environment

This research has shown that the concept of the nursing practice environment is poorly specified and inadequately measured. The most useful advances in the ongoing development of the concept of nursing practice environment will result from testing clearly specified causal relationships using powerful methods such as structural equation modeling. (Paper #2)

Nursing Leadership

A new theory of the mechanism of mitigation provides an opportunity for understanding how resonant leaders effectively reduced the negative effects for nurses who had undergone hospital restructuring. This theoretical knowledge also provides for future research opportunities to continue this line of investigation. (Paper #4)

The nurse-leader relationship is the core or essence of the nursing leader's practice as a nurse. In developing a research program of leadership science within nursing, I argue that the phenomenon of interest is the relationship between the nursing leader and the nurse founded on relational energy. What sets this research and the knowledge it will generate apart from other leader-follower research is the interest in seeking to understand the impact of this relationship on the nurse's ability to effect positive patient outcomes. What supports this phenomenon of interest contributing to the discipline of nursing is that nursing leaders approach their work from the perspective of a nurse, not just from the perspective of leadership. This is not to say that nursing leaders "nurse" their staff; they use their nursing knowledge to develop and maintain relationships with nurses to assist in enabling them to practice to their full scope of helping patients to restore health. In applying nursing knowledge, nursing leaders view their staff as whole persons deserving of respect, understanding that each nurse comes with knowledge, skills and competence to contribute in a wide array of decision making and problem resolution areas. These nursing leaders establish partnering

relationships with their nurses in order that collaboratively, they ensure that the needs of patients are met in the goal to restore health. Nurses, who are stressed and anxious due to the disruption of meanings arising from adverse events at work, are not in the best position to develop and maintain relationships with patients that support healing and health. Relationships with nursing leaders that mitigate the effects of adverse events are key to the nurse's ongoing health and well being.

The development of theory on *relational energy* in the nursing leader-nurse relationship is complimentary to nursing theories of Hildegard Peplau[30]and Ida J. Orlando[31] in which their phenomenon of interest was the nurse-patient relationship.

Research Methods (Mitigation effects)
A methodological approach of combining structural equation modeling with the means of the variables contributing to each effect demonstrated the mitigation effect of specific leadership styles. This also distinguished between the within-group effects of hospital restructuring on nurses from the between-groups impact of leadership styles on these nursing effects. (Paper #3)

Leadership & Nursing Research
A commitment to resonant leadership is an important expectation for hospital chief executive officers and senior administration to hold for their front-line managers. This includes expecting that nursing leaders will understand the importance of developing collaborative and supportive relationships with front line staff, and acting appropriately on that understanding. It also implies that these same nursing leaders will spend this time developing and maintaining relational capital among staff, communicating how the work of the staff contributes to the organization's vision, and working with providers including nurses to optimize performance and capacity to make patient care and workplace decisions. These findings suggest that leadership styles reflecting a resonant profile would result in better quality of care by front line providers. (Paper #3)

Limitations

1. The systematic review had three potential limitations. One of the inclusion criteria used for the systematic review of the literature

was *hospital restructuring that included layoffs*. This had been chosen because hospital restructuring that included layoffs characterized the most destabilizing environment for nurses both professionally and personally. It threatened their ability to work as a professional, their professional identity and their ability to provide an income necessary to achieve personal goals. Yet, the rigor with which this criterion was applied may have eliminated some studies that had not explicitly stated that their restructuring efforts had included layoffs of nursing staff. Second, a potential reporting bias may exist by including only published studies, which tend to over report positive findings. We were unable to conduct a meta-analysis due to the tremendous variation in the outcome variables measured and the heterogeneity of this group of studies. However, since we did not pool effect sizes, the risk of inflating effect size would not be present. Third, only Canadian and US research on the effects of hospital restructuring was reported in the literature. It is apparent from the International Hospital Outcomes study[12] that many more countries have experienced hospital restructuring than are yet publishing their findings. The search strategy did not restrict titles or abstracts by language and none were excluded due to a language other than English.

2. The attribution of leadership competencies to nursing leaders by the nurses who worked for them and who completed the 1998 *Alberta Nurse Survey* is a broad-brush approach to examining the styles of nursing leaders in Alberta in 1998.

   There was considerable variance in the nurses' responses, so it is clear that there were differences in how nurses perceived their leader's contributions to their work environments. When completing the questionnaire, the nurses may have been considering more than one leader in their hospital, such as their immediate supervisor or their supervisor's supervisor. This raises more questions for future research into the notion of collective leadership by a team of leaders, and the influence of the senior nursing leader's styles on the front-line nursing manager.

   The greatest challenge that I faced was measuring the emotional intelligence competence of the nurses' leaders by the answers that nurses gave to this cross-sectional survey describing

characteristics of their current job. I examined the translation validity[32] of the process to operationalize Goleman's descriptions of his six leadership styles into my research and the concurrent validity[32] of the three theoretical groupings of leadership styles (resonant, mixed and dissonant).

3. Given the personal experience that I had in managing multiple episodes of hospital restructuring and layoffs, I may be viewed as being biased and looking for, or denying the effects of hospital restructuring on nurses (depending on my values and integrity). Throughout this doctoral work, I enlisted the assistance of two dedicated and independent reviewers to critique my work (one physician researcher and one administrative colleague and doctoral student) to critique my process and findings in addition to the ongoing efforts of my committee supervisors.

Future Work in Nursing Leadership Science

In the next phase of my leadership career, I will develop a program of research in leadership science that will commence with the following four projects.

1. *An examination of how leadership styles affect nursing outcomes and patient mortality.*

2. *Test a theoretical model in which relational leadership is the determinant (independent variable) of nursing and patient outcomes.*

3. *Develop and validate a tool to measure nursing leadership competence.*

4. *Examine the nursing leader-nurse relationship as outlined in Paper 4.*

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Running head: EFFECTS OF HOSPITAL RESTRUCTURING

Paper #1 - The effects of hospital restructuring that included layoffs on individual nurses who remained employed: A systematic review of impact

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keywords: hospital restructuring, nursing layoffs, nursing, effects, systematic review, research.

The effects of hospital restructuring that included layoffs on individual nurses who remained employed: A systematic review of impact

Throughout the history of hospitals, efforts have continually been undertaken to redevelop and restructure all aspects of these organizations, from mission and governance structures to physical facility and internal care processes. The role of hospitals has evolved over the centuries from charitable poorhouses to technical and scientific medical institutions. Steady growth in the hospital industry throughout the 20th century fuelled by increasing public expectations and continual advances in medical and scientific knowledge, led to greater demand for workers in all healthcare professions. Publicly and professionally held notions that expansion would continue and that job security and loyalty of healthcare workers was unquestioned deemed these changes as positive, progressive and responsive to the changing needs of patient populations and new knowledge. This led to newer technology and ever more complex and costly procedures. Hospital nursing leaders attempt to balance their mandate of ensuring the provision of high quality care with fiscal accountability. Differing fundamental beliefs about how to achieve these mandates have led to what has been referred to as three waves of restructuring over the past 20 years (Norrish & Rundall, 2001). The first wave in the mid 1980's was motivated by a desire to improve the use of registered nurse time and professionalism by implementing care delivery systems such as primary nursing and professional decision making structures such as shared governance. There was growing recognition that nurses could and should have greater individual accountability for the care management of specific patients from admission to discharge leading to assignment

structures changing from the more traditional team nursing to primary nursing (Olinyk, 1986).

Efforts to implement patient focused care led to the second wave of restructuring in which many hospitals redesigned their clinical care processes, support services and resources to take place at the patient bedside rather than having the patient transported around the hospital (Norrish & Rundall, 2001). This approach to patient care was driven by a desire to meet patient needs better and to realign hospital resources to be primarily spent on direct patient care rather than on support departments. The number of healthcare workers that each patient would interact with each day was greatly reduced by realigning multiple support responsibilities into one new multi-skilled role. Eliminating inefficiencies would significantly reduce turnaround times for diagnostic results, length of patient stay, and costs of redundant processes. Patient satisfaction, physician/nurse collaboration, and nursing autonomy and job satisfaction were expected to increase. Research into the outcomes of implementing patient-focused or patient-centered care models showed that some goals were achieved, but generally results were mixed (Bryan et al., 1998a; Bryan et al., 1998b; Effken & Stetler, 1997; Fuss et al., 1998; Gelinas & Manthey, 1997; Kinneman et al., 1997; Pillar & Jarjoura, 1999; Watson et al., 1991).

The end of the 20th century saw new fiscal realities and political processes enter the hospital management arena leading to the third wave of restructuring to manage costs and improve efficiency (Norrish & Rundall, 2001). Massive restructuring and downsizing of this kind had never before been seen in this industry. Estimates of nursing job losses in the United States and Canada were in the tens of thousands resulting from widespread bed and hospital closures, mergers, transfer of inpatient care to ambulatory and home

settings, regionalization of health authority structures, and budget reductions in double-digit percentages (Aiken et al., 1996; Blythe et al., 2001; Maurier & Northcott, 2000; Norrish & Rundall, 2001; Shindul-Rothschild et al., 1996). Research findings into the consequences of this wave of hospital restructuring for nurses' hospital work environments are now being reported from a multinational hospital outcomes study (Aiken et al., 2001; Sochalski et al., 1999; Sochalski et al., 1998). These include decreased nurse autonomy, increased nursing workloads, increased frequency of adverse patient events and complications, and reductions in the quality of care (Aiken et al., 2001; Aiken et al., 1997; Aiken et al., 1994; Sochalski, 2001). Further, research has now shown that adverse effects on nursing outcomes are directly and explicitly related to increased patient morbidity and mortality (Aiken et al., 2002; Knaus et al., 1986; Shortell et al., 1994; Tourangeau et al, 2002).

Widespread reduction in nursing positions was a central feature of the third wave hospital restructuring. While some organizations were able to manage this reduction through graduated attrition, many were forced to layoff large numbers of nurses in short time periods to meet reduced fiscal targets. In 1995, a typical Canadian experience was that of the province of Alberta. It was the second Canadian province to redesign the governance structures for all health sectors within the province, creating 17 health regions (governed by Regional Health Authorities) to replace 283 hospital and community health boards. Shortly after came a complete reorganization of the administrative infrastructure and processes in each of the new regional health authorities. Regional planning efforts targeted consolidation of services to gain efficiencies. Some major health facilities closed while others were reduced to community health centers. The

provincial healthcare budget was reduced by 12.2% over three years and reportedly 3,100 nurses were laid off (Maurier & Northcott, 2000).

The impact of layoff on the health of individuals has been researched in longitudinal studies in sectors other than health with significant findings. There is evidence that employees who survived several rounds of downsizing over three years reported increased levels of physical work demands, decreased levels of skill discretion, lower participation, lower spousal support, increased job insecurity and increased prevalence of smoking (Kivimäki et al., 2000).

Objective

We undertook a systematic review to assess current evidence about the effects of hospital restructuring that included nursing layoffs, on individual registered and licensed practical nurses. No such reviews were found in the literature. We report the findings of this systematic review including recommendations for policy change and further study. The research question that guided the review was "What were the effects of hospital restructuring that included layoffs on individual hospital nurses?"

Methods

Inclusion criteria

Papers that addressed hospital restructuring resulting in layoffs, effects on nurses, and research were included. The first criterion was the presence of hospital restructuring. Events such as patient care redesign, regionalization of health services, staffing or skill mix changes, changes in care delivery systems, bed closures or organizational changes were considered evidence of restructuring. The restructuring had to result in layoff of nursing staff. This eliminated a body of research that examined effects of restructuring on

nurses but in environments that did not have the threat of or actual job loss. Second, the study had to examine the effects of hospital restructuring on nurses, such as increased turnover, physical or psychological health effects or morale changes. Effects on organizations such as the impact on recruitment and retention of nurses were not included. Third, the population under study had to include nurses in hospitals. The fourth criterion included research studies, whether quantitative or qualitative.

Data Sources

We initiated the search strategy by accessing the on-line bibliographic databases CINAHL, Medline, Healthstar, EMBASE, ERIC and AMED from inception to 2001 with CINAHL yielding the highest number of included abstracts. Dissertation Abstracts was searched on-line but yielded no new results. Only published research was targeted. We sought publications that had undergone peer review as a first, albeit less than ideal, screen of quality. Searches were not restricted to English; however no titles or abstracts related to hospital restructuring research in languages other than English were retrieved. Manual searches of British Medical Journal, Canadian Medical Association Journal, and Medical Care Research and Review were completed for 1998-2001. Medical Care was searched from 1997-2001 as it had a dedicated issue to hospital restructuring in 1997. Seven research unit websites (Centre for Health Economics and Policy Analysis www.chepa.org; Centre for Health Services and Policy Research www.chspr.ubc.ca; Health Services Utilization and Research Commission www.hsurc.sk.ca; Institute for Clinical Evaluative Services www.ices.on.ca; Nursing Effectiveness Utilization and Outcomes Research Unit www.fhs.mcmaster.ca/nru; Canadian Policy Research Networks and the Regionalization Research Centre, www.cprn.com/cprn.html) were accessed with

2 new results. The total yield from the manual and websites searches was 42, including one duplicate from the on-line database search. See Figure 1 for search strategy.

[Take in Figure 1]

On-line and manual searches yielded a total of 1203 search titles and abstracts. The first author reviewed all search titles/abstracts and using the four preliminary inclusion criteria selected 122 abstracts. These included 38 duplicates, leaving 84 abstracts that met the inclusion/exclusion criteria. A second reviewer reviewed 300 randomly chosen titles/abstracts to test reliability of the application of inclusion criteria. There was 100 % agreement in the results of the two reviewers.

Screening

The first author screened all 84 papers using the four initial inclusion criteria. Several studies that had met the inclusion criteria were found to have problematic research designs, leading to the need for a fifth criterion. There had to be a reported relationship between the independent variable (measure of hospital restructuring) and the dependent variable (nursing outcomes such as emotional exhaustion, changes in role or job satisfaction) in the quantitative studies. A second reviewer randomly screened 40 of the 84 papers, blinded to the author's review. Discrepancies on four papers were discussed and consensus reached. The screening yielded 32 empirical studies (24 quantitative and 9 qualitative with one paper counted in each category).

The primary author and a second reviewer screened the nine qualitative studies against the four initial inclusion criteria excluding five papers (See Table 1). The four remaining qualitative studies were not subjected to a numerical quality rating; however each had methods appropriate for the research question, appropriate and adequate

sampling, iterative processes for collecting and analyzing data, and outcomes that went beyond data description to substantive theory or conceptual frameworks (Kuzel & Engel, 2000; Morse, 1991a; Morse, 1991b).

Three researchers in this field were contacted and asked to comment on the process, the yield and any possible omissions. One responded indicating that the process and inclusion was comprehensive.

Data Extraction

The following data were extracted: author, journal, country, research questions, design, subjects, sample, method, analysis, instrument, reliability and validity, intervention of hospital restructuring, measure or description of hospital restructuring, measure of effects on nurses, significant results, non-significant results, discussion and recommendations. While completing this detailed data extraction, 4 additional papers were excluded as they were found not to meet the 5 inclusion criteria. This left 20 quantitative papers representing 15 studies.

Quality review

Each article was reviewed twice for methodological quality by the first author. The quality rating tool used was adapted from an instrument used in two published systematic reviews (Estabrooks et al., 2003; Estabrooks et al., 2001). Thirteen items were used to rate four main areas of research — design, sampling, measurement, and analysis. Each item scored one point, with the outcomes measurement item scoring two. Total score could range from zero to fourteen. Each paper received a total score that fell into one of three categories: strong (10-14), moderate (5-9) or weak (0-4). Fourteen studies in this review were moderate, 4 were strong and two were weak. Only studies that rated greater

than 4 points, that is moderate or strong, were retained. The two weak studies had significant shortcomings in the measurement and analysis portions of their design. Table 1 summarizes the strengths and weaknesses of the final included group of 18 quantitative studies.

[Take in Table 1]

The weaknesses shared among most studies were use of self-report method, low response rates, non-random sampling, and inadequate management of outliers. The general strengths of this final included group were prospective designs, use of multiple sites and repeated measures.

Results

Search results

Of the 22 papers (18 quantitative and 4 qualitative) in the final inclusion group, 8 were completed in the USA and 14 in Canada (see Table 2 for characteristics of included quantitative studies). All studies were published between 1993 and 2001. The 4 qualitative studies were not included in Table 2; however their findings are reported in Table 3. While their contributions are small, they are consistent with the findings of the quantitative research.

[Take in Table 2]

Demographics of nurse subjects were reported in 17 quantitative studies. Across these studies, the subjects' mean age ranged from 35.2 to 54.5, with a mean of the mean age across studies of 41.5. Percentage of female subjects ranged from 75 to 98 with a mean of 95%. Percentage of fulltime workers ranged from 48 to 84 with a mean of 53%. Percentage with a baccalaureate degree ranged most widely from 17 to 95 with a mean of

20%. The unit of analysis was at the individual nurse level in all studies, of which two also used the hospital and/or nursing unit as units of analyses. Instrument reliability measures were reported in 16 papers; however validity measures were only reported in 6 papers. Of the 18 quantitative papers, 5 measured the extent of restructuring as the independent variable, 6 described hospital restructuring as an intervention between pre and post observations without measuring it, and 7 measured hospital restructuring as an intervention between pre and post observations.

Study Results

Seventy different outcome variables were reported in these 22 quantitative and qualitative studies. Findings were sorted using basic content analysis into four outcome categories — 1) effects of hospital restructuring on nurses' physical and psychological health, 2) effects on nursing job and career satisfaction, 3) effects on nursing roles and patient care, and 4) effects on relationships with colleagues. These themes were not determined a priori. Findings are listed in Table 3 grouped under the four themes.

[Insert Table 3 here]

Effects on nurses' job and career satisfaction. The predominant effect of hospital restructuring was a decrease in job satisfaction. Job satisfaction was higher only in longer tenured nurses, or in hospitals that reported better communication. Nurses' satisfaction with supervision decreased in the four studies in which it was measured, primarily due to changes in their relationship with management. Nurses' commitment to their job and/or organization decreased significantly in addition to an increase in their intention to quit their jobs. This was found particularly among nurses who had shorter tenure (years of experience) with the organization, were less satisfied, were fulltime yet preferred to be

part-time, or who had changed nursing units. An increase in actual turnover rates was reported in two studies in which it was measured.

Following hospital restructuring, nurses perceived that they had fewer opportunities for promotion or changing jobs, while less experienced nurses also perceived significantly reduced job security. Increased satisfaction with financial rewards was reported in 3 of 4 studies in which it was measured. The remaining effects such as satisfaction with scheduling, occupational stress, satisfaction with physical working conditions, balance of work and family and nurses commitment to profession were studied individually in single studies, were non-significant or the findings were equivocal. Overall, the effects of hospital restructuring on nurses' satisfaction with their current job have been substantial. The recruitment and retention issues experienced by hospitals worldwide have been compounded by nurses' discontent with their current job or organization, by nurses' intent to leave their positions and by the lack of future nursing career prospects.

Effects on nurses' physical and psychological health. An increase in emotional exhaustion was the second most frequently and consistently cited outcome, followed by an increase in absences from work. Both of these findings were associated with nurses who were fulltime, who had changed units or were still employed years after hospital restructuring, regardless of their years of experience. These same groups of nurses, with the exception of those who had less tenure, reported increased psychosomatic symptoms. One study however, found psychosomatic symptoms reduced once restructuring was completed. Nurses who had been employed longer reported increased medication use. The remaining effects were studied individually in single studies or were non-significant.

Overall, these findings point to potentially serious effects on the health and well being of nurses. This is crucial in light of recent research findings that show emotional exhaustion among nurses has been associated with higher patient mortality (Aiken et al., 2002). Considering the enormous effort that the nursing profession places on the health and well being of its patients, the health of nurses should be a taken in consideration by policy-makers and hospital decision-makers when decisions are made about restructuring hospitals or programs.

Effects on nursing role and patient care. Nurses perceived that their workload increased significantly following hospital restructuring. This was confirmed by one study that measured actual workload. Nurses also perceived increases in patient acuity and number of admissions, but no studies reported findings of actual changes in acuity or number of admissions. Nurses reported less satisfaction with centralization of decision-making, amount of control they had over their practice, and the amount of time they had to spend with patients. In decentralized settings, nurses reported greater satisfaction with autonomy and time to spend with patients. Nurses reported that their efficiency in performing professional nursing functions was significantly reduced following hospital restructuring. The opportunity and ability for nurses to communicate important patient information was negatively affected by hospital restructuring. The remaining effects were primarily reported in single studies or were found to be equivocal. Overall, increases in workload and decreases in the quality and amount of time that nurses spend with their patients can also compound the previous outcomes of decreased job satisfaction and increased emotional exhaustion.

Effects on relationships with colleagues. A decrease in social interaction among nurses and colleagues along with the reported loss of work group cohesion and integration was the primary significant finding in this category. This is consistent with Bauman's finding that the greater the amount of change for a nurse (from new role, to changing units or hospitals), the greater amount of time was needed to become part of a team. Remaining findings were non-significant or limited to single studies. This finding is of particular concern given the importance of nursing / physician relationships in the provision of quality patient care (Baggs et al., 1999; Knaus. et al., 1986; Shortell et al., 1994).

Comment

We completed this study to determine the status of evidence on the effects of hospital restructuring that included layoffs on individual nurses. The papers in this review represent the responses of over 12,000 nurses. Not all nurses affected by hospital restructuring experienced the effects in the same way. Younger, less experienced nurses, who were not fulltime, were not in the job status (fulltime or part-time) that they preferred or who experienced multiple episodes or elements of restructuring experienced the greatest effects. The effects of hospital restructuring on nurses include a significant decrease in job satisfaction, increase in turnover, reduction in professional efficacy and ability to provide quality care, disruption to health care team relationships and personal physical and psychological health effects (Table 3).

A number of these studies were longitudinal (3-5 years) and all included studies were published after 1992. Ongoing research to determine the longer term effects of

restructuring and layoffs on individual nurses, the nursing workforce, nursing practice environments and patient outcomes is needed.

Recommendations

Based on our synthesis, we formulated several recommendations for ongoing research in this area. First, most studies on the effects of hospital restructuring were based on self-report survey designs. We encourage investigations based on observed effects over longer terms.

Second, randomization within studies using repeated measures over a number of years would inform us on long-term effects on nurses. We acknowledge the difficulty of achieving randomization when an entire state, province or country undergoes massive restructuring due to government policy changes at the same time. Investigators have also focused on nurses who have remained in the profession (sometimes termed "survivors"). A significant group of nurses that have not been studied are those who left the profession during restructuring. If these nurses who have left are the younger individuals shown to have been particularly affected by hospital downsizing, they are potentially a valuable resource to the human resource needs of the nursing profession.

Third, in order to more accurately assess outcomes, the intervention itself – hospital restructuring – has to be more clearly described and measured. The description and extent of hospital restructuring as well as how the variable was measured, were the most difficult components to glean from the studies in this review. While preliminary findings suggest that multiple hospital restructuring events have a greater impact on staff, important questions remain. Did organizations that managed bed closures and downsizing through attrition have different outcomes than those that entered into layoff and

"bumping"[1] processes? Does organizational culture prior to downsizing differentially affect these outcomes? To what extent do leadership behaviours by nursing decision-makers mitigate the effects of hospital restructuring?

Fourth, instruments that measure effects on individual nurses, primarily satisfaction and stress scales, are generally well developed and tested. However, the temporal nature of these effects is not well studied, that is, how persistent are these effects in nurses? Are nurses who are highly disillusioned after restructuring affected indefinitely or is there anything that can be done by the individual or the organization to mitigate these effects?

Fifth, research into strategies that may mitigate the effects of restructuring are an important next step in this field. Assuming that hospital restructuring will continue to be used in the future as a means of managing fiscal challenges and political pressures, layoff and recall clauses within collective agreements must be revisited to ensure that the youngest and healthiest resource with the greatest years of contribution left to give are not continually sacrificed. This may require creative incentives for more senior nurses to move into other areas of practice that utilize their years of experience and skills to support mentoring and planning.

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[1] Bumping is most commonly seen in unionized settings and refers to the process that follows the layoff or position elimination of a senior nurse (defined by having an earlier date in which s/he commenced employment within the bargaining unit than a less senior nurse). S/he can choose to take the position of any nurse who commenced employment at a date later then her own. The latter nurse can then do the same until there are no more junior nurses to displace. This can result in many more nurses being displaced than the total number of positions eliminated.

Limitations

The strength of our review lies in the rigorous selection of included research papers in a field that is new and clouded by numerous definitions and understandings of hospital restructuring. This review has two potential limitations. First, a potential reporting bias may exist by including only published studies, which tend to over report positive findings. We were unable to conduct a meta-analysis due to the tremendous variation in the outcome variables measured and the heterogeneity of this group of studies. However, since we did not pool effect sizes, the risk of inflating effect size would not be present. Second, only Canadian and US research on the effects of hospital restructuring was reported in the literature. It is apparent from the International Hospital Outcomes study (Aiken et al., 2001) that many more countries have experienced hospital restructuring than are yet publishing their findings. Our search strategy did not restrict titles or abstracts by language and none were excluded due to a language other than English.

Conclusions

In this systematic review we have demonstrated that research into the effects of hospital restructuring on nurses is 1) relatively recent, 2) of significant interest, and 3) primarily descriptive of restructuring events and nurses' reactions. Hospital restructuring is shown to have significant negative effects on nurses including a decrease in job satisfaction, increase in turnover, reduction in efficacy and ability to provide quality care, disruption to health care team relationships and personal physical and psychological health effects. Research from municipal service sectors has shown that restructuring has long-term negative effects on the health and well being of employees (Kivimäki et al., 2000). Understanding that the pressures within our health care systems to restructure hospitals

will not soon disappear, research is urgently needed in the healthcare sector to determine if hospital restructuring also has long lasting and deleterious effects on nurses – and ultimately patients, and if individual and organizational strategies, including leadership behaviours, can mitigate these effects.

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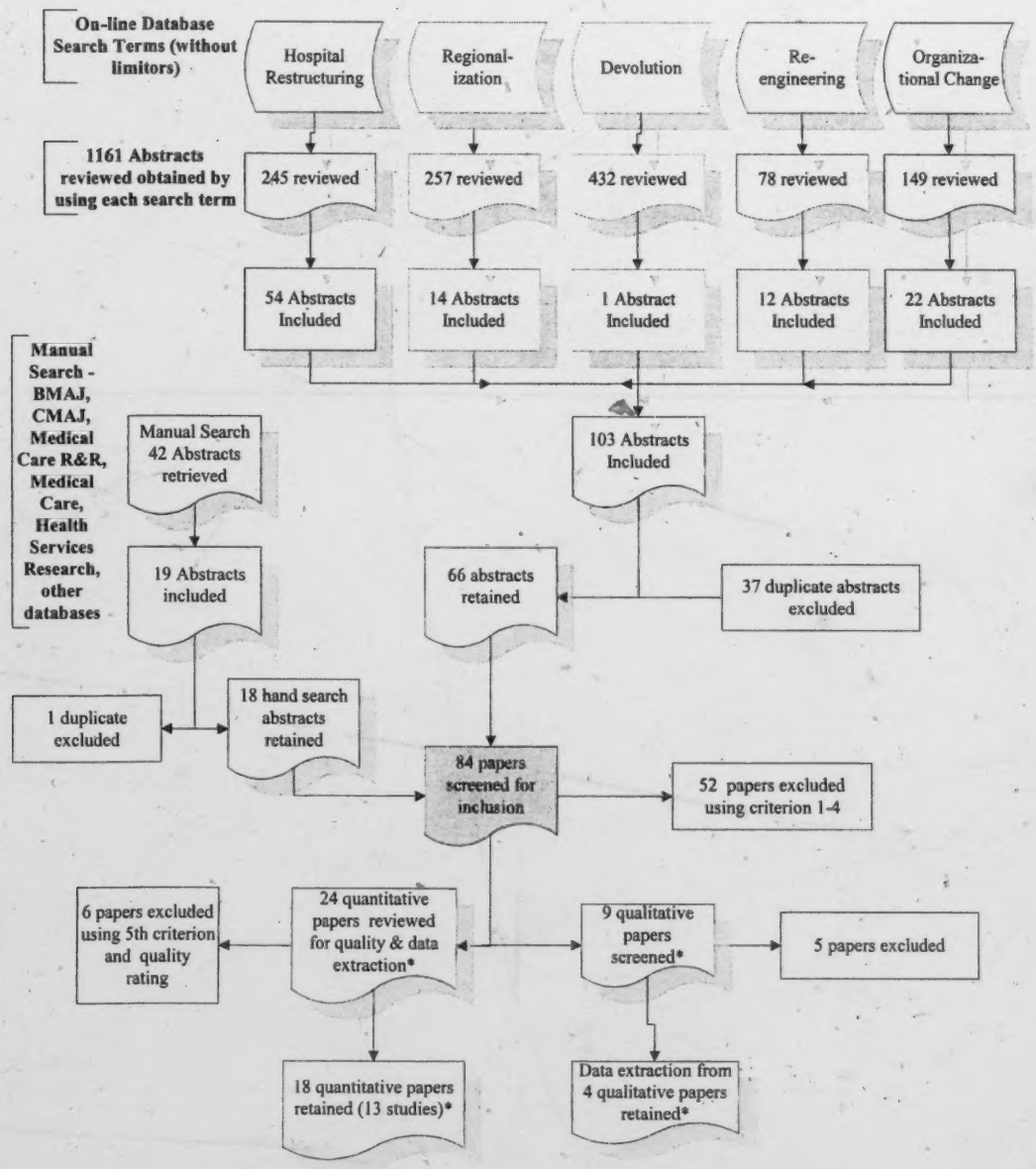
Figure 1: Search Strategy


On-line Database Search Terms (without limitors)
Hospital Restructuring
Regional-ization
Devolution
Re-engineering
Organiza-tional Change
1161 Abstracts reviewed obtained by using each search term
245 reviewed
257 reviewed
432 reviewed
78 reviewed
149 reviewed
54 Abstracts Included
14 Abstracts Included
1 Abstract Included
12 Abstracts Included
22 Abstracts Included
Manual Search - BMAJ, CMAJ, Medical Care R&R, Medical Care, Health Services Research, other databases
Manual Search 42 Abstracts retrieved
103 Abstracts Included
19 Abstracts included
66 abstracts retained
37 duplicate abstracts excluded
1 duplicate excluded
18 hand search abstracts retained
84 papers screened for inclusion
52 papers excluded using criterion 1-4
6 papers excluded using 5th criterion and quality rating
24 quantitative papers reviewed for quality & data extraction*
9 qualitative papers screened*
5 papers excluded
18 quantitative papers retained (13 studies)*
Data extraction from 4 qualitative papers retained*

* One study had substantive quantitative and qualitative components and was counted in each category.

Table 1: Summary of Quality Assessment — 18 Included Quantitative Papers

	# of studies YES	NO
Design:		
Prospective studies	13	5
Used probability sampling	12	6
Sample:		
Appropriate/justified sample size	17	1
Sample drawn from more than one site	13	5
Anonymity protected	8	10
Response rate > 60%	4	14
Measurement:		
Reliable measure of hospital restructuring	12	6
Restructuring was of sufficient magnitude to be measured	14	4
Effects (outcomes) were measured rather than self-reported*	1	17
Internal consistency ≥ .70 when scale used	16	2
Theoretical model/framework used	13	5
Statistical Analysis:		
Correlations analysed when multiple effects studied	18	0
Management of outliers addressed	4	14

* This item scored 2 points. All others scored 1 point.

Table 2: Characteristics of included quantitative studies

Author(s) /Journal	Subjects	Measurement	Scoring	Reliability	Validity	Analysis
Armstrong-Stassen, et al Can J of Nrsg Admin 1996 Canada	258 RNs 87 RPNs 3 hospitals	Job satisfaction (Minnesota satisfaction questionnaire) Organizational reactions (Inventory of organizational responses)	20 items Total score per subscale / # items	Overall α=. 87 α=. 74 - 92	Not reported	MANOVA ANOVA
Barry-Walker J of Nrsg Admin 2000 USA	3 nursing units 192 RNs 135-LPNs, NAs & unit clerks	Unassisted patient falls Medication errors Autonomy (Job Characteristics inventory) Social integration (McCain & Marklin) Job satisfaction (Job Diagnostic Survey) Job satisfaction (Mccloskey & Mueller satisfaction scale)	Patient falls /1,000 PD Medication errors /10,000 doses *Total score for 6 items *Total score for 8 items *Total score for 3 items *Total score for 5 items	α=. 74-.86 α=. 71-.81 α=. 64-.87 α=. 41-.60 & α=. 80-.91	Not reported	MANOVA ANOVA Tukey tests Nurses and hospitals were units of analysis
Baumann, et al Can J of Nrsg	1728 RNs & RPNs	Organizational Commitment Questionnaire Commitment to profession & Quality of work	Not specified 22 item scale	α=0.82-93 ICC=. 73-.88	Test-retest validity	ANOVA T-tests

Author(s) /Journal	Subjects	Measurement	Scoring	Reliability	Validity	Analysis
Leadership 2001 Canada	2 hospitals	environment (American Journal of Nursing Care survey) Quality of care total survey 72 questions including above	Not specified		Expert content review Pretest for face validity	Scheffe test
Beckworth PhD dissertation 1996 USA	359 RNs, 95 SWs	Job Stress Diagnostic Survey (Ivancevich & Matteson 7 items & 8 items) Organizational commitment OCQ (15 items) Index of Job Satisfaction (18 items) Turnover (Michigan Organizational Assessment Questionnaire 3 items)	Data aggregated across social work and nursing service areas, practice area, practice area, geography, hospital size and type	α=. 95-.96 α=. 91 α=. 91 α=. 62	Construct validity CFA Expert panel provided content review	Structural equation modeling
Begley & Czajka J of Applied Psych 1993 USA	Clinical staff 102 time 1 105 time 2	Job satisfaction (1 item) Intent to quit (2 items) Work-related depression (Caplan Depression scale) Work-related irritation (Caplan Irritation scale) Somatic complaints (Caplan Somatic	Score on single item *Total score for 2 item scale *Total score for 6 item scale *Total score for 3 item	α=. 71: MSQ α=. 79 & .76 α=. 80 & .85 α=. 81 & .86	Canonical correlation to assess for Type 1 error	Factor analysis ANOVA Regression

Author(s) /Journal	Subjects	Measurement	Scoring	Reliability	Validity	Analysis
		Complaint)	scale *Total score for 10 item scale	α=. 74 & .70		
Burke Psych Reports 2001 Canada	744 RNs	Reaction to downsizing (Speitzner & Mishra's16 items plus 4 items) Control coping -17 items. Escape coping - 11 items	Total score for four 5 item scales Not specified	α=. 56-.86	Content Concurrent	Factor Analysis Regression
Burke J of Nursing Admin 2001 Canada	393 RNs	Support Impact **Work outcomes** Psychological burnout Psychological well-being	Score for single item *Total score for 2 item scale *Total score for 4 item scale *Total score for 3 item scale *Total score for 3 item scale	Not reported	Not reported	One way ANOVA to compare mean values between time 1 & 2

Author(s) /Journal	Subjects	Measurement	Scoring	Reliability	Validity	Analysis
Burke & Greenglass Health Care Manager 2001 Canada	1362 RNs	Work Outcomes (6 subscales, 25 items) Psychological well-being (44 items)	*Total score for subscales *Total score for 30 item scale and subscales	α=. 30-90 α=. 29-.92	Not reported	
Burke & Greenglass Psych Reports 2000 Canada	1362 RNs	Work Outcomes (6 subscales, 25 items) Psychological well-being (44 items)	*Total score for subscales *Total score for 30 item scale and subscales	α=. 30-90 α=. 29-.92	Not reported	
Burke & Greenglass Int J of Nrsg Studies 2000 Canada	1362 RNs	Same as above plus Implementation and management Measures (12 items)	Total score for each subscale	α=. 50-.92	Not reported	Pearson correlations
Burke & Greenglass	1950 RNs	Work Outcomes (2 scales, 7 items)	*Total score for each subscale	α=. 82 - .87	Not reported	Pearson correlations

Author(s) /Journal	Subjects	Measurement	Scoring	Reliability	Validity	Analysis
J of Occup Health Psych 1999 Canada		Psychological well-being (Parasuraman, et al, 7 scales, 56 items)	*Total score for each subscale	α=. 54 - .92		
Cameron, et al NRU Final Research Report 1994 Canada	422 RNs 149 RPNs 4hospitals	Job satisfaction (Minnesota Satisfaction Questionnaire)	20 items	Overall α=. 87	Not reported	MANOVA Hierarchical regression
		Job facet satisfaction (Inventory of organizational responses)	Total score per subscale/# items	α=. 74-92		
		Propensity to leave (Lyons Index)	3 items	α=. 87		
		Burnout (Maslach & Jackson)	20 items	α=. 90		
		Trust in management (Adapted from Cook et al)	3 items	α=. 91		
Davidson, et al Medical Care 1997 USA	685 RNs time 1 358 RNs time 2	Job Satisfaction (Brayfield & Rothe, modified by Hinshaw, 23 items)	Total scores for each scale	CFA – .65-.80	Not reported	Paired t-tests Multivariate linear regression
		Turnover (Price and Meuller's Model)		α=. 70-.91 for all scales		
		Mastery or locus of Control (Perlin Schooler)				

Author(s) /Journal	Subjects	Measurement	Scoring	Reliability	Validity	Analysis
Duncan, et al Can J of Nrsg Research 2001 Canada	6526 RNs 126 hospitals	Nurses asked to indicate if they had experienced any of the 5 types of violence over last 5 shifts worked. Frequencies for each type of violence				Frequencies Multiple regression Units of analysis were nurse and hospital
Krugman & Preheim J of Nrsg Admin 1999 USA	262 RNs time 1 330 RNs time 2	Nursing job satisfaction MMSS (8 domains, 31 items) Autonomy (Schutzenhofer's Scale) Patient Satisfaction (Picker Institute Survey, 35 items)	*Total scores on each subscale *Total scores on scale	α=. 89 α=. 92	Not reported	ANOVA
Maurier & Northcott Western J of Nrsg Research	277 RNs 1 hospital	Physical Health (adapted from Lowe & Northcott, 7 items) Depression CES-D (20 items) Perceived job Security (2 items)	Total score on each scale	α=. 79 α=. 90 α=. 85	Not reported	Hierarchical regression analysis

Author(s) /Journal	Subjects	Measurement	Scoring	Reliability	Validity	Analysis
2000 Canada		Stressful Working Conditions (Spooner 1979) Primary Appraisal (Lazarus & Folkman, 12 items) Ways of Coping (Lazarus & Folkman, 8 subscales)	Total score on each scale Total score on each subscale	α=. 90 α=. 57-.79		
Santos PhD dissertation 1997 USA	110 RNs	Occupational Stress Inventory (140 items) RN Disillusionment Scale (dev. by researcher)	Total score on each scale	α=. 71-.94 α=. 90	Pilot tested; panel review before pretest	Regression Nonparametric tests
Weir, et al National Academies of Practice Forum 1999 Canada	All healthcare staff on 14 inpatient units	Work Activities - Work-sampling techniques used to rate the activities simultaneously performed by all health team members during scheduled sample hours randomly assigned among 14 inpatient units.	Frequencies of observed activities	IRR K=. 53 -.62 time 1 K=. 50 - 70 time 2	Observation checklists RAs trained in observation	Pre and post downsizing observation.

- Total score was implied in the paper but not specified

RNs – registered nurses
RPNs – registered practical nurses
LPNs – licensed practical nurses
NAs – nursing attendants
IRR – inter-rater reliability

Table 3: Summary of study outcomes

Effects of hospital restructuring on nursing job and career satisfaction	Source	Significant Findings	Comment
Job satisfaction	Barry-Walker (2000)	Decreased	Lowest at unit merger
		Decreased	Atmosphere's impact on job satisfaction lowest at unit merger
	Beckworth (1996)	Decreased	
	Begley & Czajka (1993)	Decreased	Thru MICRO organizational stress
	Burke & Greenglass (1999)	Decreased	
		NS	
	Burke & Greenglass (2000b)	Increased	Thru increased workload, WFC
	Burke (2001b)	NS	Thru personal characteristics
	Burke & Greenglass (2001)	Decreased	Longer tenured nurses
	Burke & Greenglass (2000a)	NS	Nurses still working yrs after
	Cameron et al (1994)	Decreased	HR
		Increased	Nurses who changed units
			Fulltime vs. part-time nurses
	Davidson et al (1997)	Decreased	FT nurses who prefer PT
		Increased	Thru satisfaction with supervision & kind of work
Job displeasure	Begley & Czajka (1993	Increased	Only with good instrumental communication
			Staff low in commitment. Stress had no effect for highly committed staff.
Satisfaction with supervision	Armstrong-Stassen et al (1996)	Decreased	
		Decreased	By both RNs and RNAs
	Cameron et al (1994)	Decreased	Relationship with supervisor changed
	Clifford (1997)	Decreased	
	Ingersoll et al (2001)		Trusting relationship with administration lost
Intent to quit	Begley & Czajka (1993)	Increased	
	Burke (2001b)	Decreased	Nurses still working yrs after

Effects of hospital restructuring on nursing job and career satisfaction	Source	Significant Findings	Comment
	Burke & Greenglass (2000b)	Decreased	HR
	Burke & Greenglass (2001)	Increased	Longer tenured nurses
	Burke & Greenglass (2000a)	Decreased	Nurses who changed units
	Cameron et al (1994)	Increased	Fulltime nurses
		Increased	FT nurses who prefer PT
	Davidson et al (1997)	Increased	Thru decreased job satisfaction
Actual turnover	Beckworth (1996)	Increased	Shorter tenure, fewer work hours per week, negative perception of instrumental communication, ability to make decisions, limited promotional opportunity, intent to leave at baseline
	Davidson et al (1997)	Increased	Thru organizational commitment and job satisfaction Thru intent to leave, fewer years of employment and satisfaction with time to do the job at baseline
Commitment to the job	Davidson et al (1997)	Decreased	
	Baumann et al (2001)	Decreased	Nurses who changed units Changing hospitals was greater
Commitment to hospital / organization	Beckworth (1996)	Decreased	Thru MACRO organizational stress
	Begley & Czajka (1993)	NS	
	Armstrong-Stassen et al (1996)	Decreased	
		Increased	
Satisfaction with hospital identification	Cameron et al (1994)	Decreased	Older nurses FT nurses who prefer PT
Job security	Armstrong-Stassen et al (1996)	Decreased	Part-time staff
		Decreased	Following unit merger
	Barry-Walker (2000)	Increased	Longer tenured nurses

Effects of hospital restructuring on nursing job and career satisfaction	Source	Significant Findings	Comment
Future threat to jobs	Burke & Greenglass (2000b)	Increased	Nurses still working yrs after HR
	Burke (2001b)	NS	
	Burke & Greenglass (2000a)	Decreased	Fulltime vs. part-time nurses
	Cameron et al (1994)	Increased	Shorter tenured nurses
	Burke (2001b)	Decreased	Older nurses
			Nurses still working yrs after HR
Job mobility options	Burke & Greenglass (2000b)	Decreased	Longer tenured nurses
	Davidson et al (1997)	Decreased	
Professional / promotional opportunity	Davidson et al (1997)	Decreased	
	Krugman & Preheim (1999)	Decreased	
Satisfaction with financial rewards	Armstrong-Stassen et al (1996)	Increased	
	Burke & Greenglass (2000b)	Increased	Longer tenured nurses
	Cameron et al (1994)	Increased	Older nurses and longer tenured nurses
	Krugman & Preheim (1999)	Decreased	
Career Future	Armstrong-Stassen et al (1996)	Decreased	Largest reduction
	Cameron et al (1994)	Increased	Older nurses
Satisfaction with scheduling	Krugman & Preheim (1999)	Decreased	
Occupational stress	Santos (1997)	Increased	Layoffs, increased supervisory duty, working in specialized areas
Satisfaction with physical working conditions	Cameron et al (1994)	Decreased	FT nurses who prefer PT
Balance of work and family	Krugman & Preheim (1999)	NS	
Nurses commitment to profession	Baumann et al (2001)	NS	Rated high

Table 3: Summary of study outcomes cont'd

Effects of hospital restructuring on nurses' physical and psychological health	Source	Significant Findings	Comment
Emotional exhaustion	Burke & Greenglass (1999)	Increased	Thru fulltime, workload, WFC
		NS	Thru personal characteristics
	Burke (2001b)	Increased	Nurses still working yrs after HR
	Burke & Greenglass (2001)	Increased	Nurses who changed units
	Burke & Greenglass (2000a)	Increased	Fulltime nurses
	Cameron et al (1994)	Increased	FT nurses generally and those who prefer PT
			Shorter tenured nurses
	Ingersoll et al (2001)	Increased	Thru decreased satisfaction with amount and kind of work
Absence from work	Burke & Greenglass (1999)	Increased	Thru work situation characteristics, WFC, FWC
		NS	Thru personal characteristics
	Burke (2001b)	NS	Nurses still working yrs after HR
	Burke & Greenglass (2001)	Increased	Nurses who changed units
	Burke & Greenglass (2000a)	Increased	Fulltime nurses
	Ingersoll et al (2001)	Increased	
Psychosomatic symptoms	Begley & Czajka (1993)	Decreased	Thru tenure, supervisory duties, work stressors, WFC, FWC
	Burke & Greenglass (1999)	Increased	Thru personal characteristics
		NS	Nurses still working yrs after HR
	Burke (2001b)	Increased	Longer tenured nurses
	Burke & Greenglass (2000b)	Decreased	Nurses who changed units
	Burke & Greenglass (2001)	Increased	
Physical health	Burke (2001b)	NS	Nurses still working yrs after HR
	Burke & Greenglass (2000b)	Decreased	

Effects of hospital restructuring on nurses' physical and psychological health	Source	Significant Findings	Comment
	Burke & Greenglass (2001)	NS	Longer tenured nurses
	Maurier & Northcott (2000)	Decreased	Nurses who changed units
			When co-worker laid-off / bumped
			Threat of being put on recall status
			Job insecurity due to seniority
		Increased	Physical working conditions
		NS	Escape avoidance coping, Planful problem-solving, Only with positive appraisal
			Primary cognitive appraisal
Medication use	Burke & Greenglass (1999)	Increased	Thru age, hospital size, work stress, WFC, FWC
	Burke (2001b)	Increased	Nurses still working yrs after HR
	Burke & Greenglass (2000b)	Increased	
	Burke & Greenglass (2001)	NS	Longer tenured nurses
			Nurses who changed units
Depression	Begley & Czajka (1993)	NS	
	Maurier & Northcott (2000)	Increased	From threatening situations & lower positive appraisal
		NS	Job uncertainty and physical working conditions
Cynicism	Burke (2001b)	NS	Nurses still working yrs after HR
	Burke & Greenglass (2000a)	Increased	Fulltime nurses
Negative lifestyle behaviours	Burke & Greenglass (2000b)	Increased	Longer tenured nurses
	Burke & Greenglass (2001)	NS	Nurses who changed units
Perceived work related injuries	Baumann et al (2001)	Increased	Nurses in a new role
Actual work related injuries		NS	

Effects of hospital restructuring on nurses' physical and psychological health	Source	Significant Findings	Comment
Emotional Abuse	Duncan et al (2001)	Increased	Younger nurses, experienced HR, work in psychiatry or emergency & who perceived lower quality care.
Escape Coping	Burke (2001a)	Increased	Nurses endorsing cynical response
Control coping.	Burke (2001a)	Increased	Nurses endorsing hopeful or obliging responses
Disillusionment	Santos (1997)	Increased	Increased assignments to other units Nurses perceiving decreased quality of care Increased supervisory duties Experience layoffs Increased delegation to UAP
Work-irritation	Begley & Czajka (1993)	NS	

Table 3: Summary of study outcomes cont'd

Outcomes: Effects of hospital restructuring on nursing roles and patient care	Source	Significant Findings	Comment
Perceived workload / overload	Baumann et al (2001)	Increased	Nurses who changed units
	Burke & Greenglass (2001)	Increased	Nurses who changed units
	Burke & Greenglass (2000a)	Increased	Fulltime nurses
	Davidson et al (1997)	Increased	
Actual workload	Baumann et al (2001)	Increased	Nurses who changed units
Perceived acuity of patients	Baumann et al (2001)	Increased	Nurses who changed units
Perceived # of admissions			
Control over work activities	Blythe et al (2001)	Decreased	
	Barry-Walker (2000)	Decreased	
Satisfaction with control over practice	Krugman & Preheim (1999)	Decreased	
	Davidson et al (1997)	Decreased	After decentralization & empowerment
Satisfaction with centralization	Krugman & Preheim (1999)	Increased	
		Decreased	After HR with layoffs
Autonomy	Cameron et al (1994)	Increased	
			Older nurses and FT RNAs
Satisfaction with influence at work			
Professional efficacy	Burke (2001b)	NS	Nurses still working years after HR
	Burke & Greenglass (2001)	Decreased	
	Burke & Greenglass (2000a)	Decreased	Nurses who changed units
	Blythe et al (2001)	Decreased	Fulltime nurses
	Ingersoll et al (2001)	Decreased	
Satisfaction with time to do job (e.g.) talk to patients	Baumann et al (2001)	Decreased	Nurses who changed units
	Davidson et al (1997)	Decreased	
	Ingersoll et al (2001)	Decreased	
	Weir et al (1999)	Increased	In decentralized settings
		Decreased	Time spent checking care & teaching patients

Outcomes: Effects of hospital restructuring on nursing roles and patient care	Source	Significant Findings	Comment
Nurses develop effective communications	Krugman & Preheim (1999)	Decreased	
Nurses record patient data on chart	Krugman & Preheim (1999)	Decreased	
Accountability for communicating patient information	Ingersoll et al (2001)	Decreased	
Professionalism / Professional activities	Davidson et al (1997)	NS	
	Weir et al (1999)	Increased	In centralized settings
		Decreased	In centralized settings with downsizing
Satisfaction with quality of care	Baumann et al (2001)	NS	Between groups
	Davidson et al (1997)	Decreased	
		Increased	Only with stronger job commitment, less overload and working on smaller units
Ability to provide quality care	Baumann et al (2001)	Decreased	Nurses who changed units
Negative effects of generic workers	Burke & Greenglass (2001)	Increased	Nurses who changed units
	Burke & Greenglass (2000a)	NS	Fulltime vs. part-time nurses
Nurses answer patient questions	Krugman & Preheim (1999)	Decreased	
Nurses initiate discharge planning	Krugman & Preheim (1999)	Decreased	
Nurses evaluate patient needs	Krugman & Preheim (1999)	Decreased	
Perceived patient complaints	Baumann et al (2001)	Increased	Nurses who changed units
Patient satisfaction	Krugman & Preheim (1999)	Decreased	
Actual medication errors	Barry-Walker (2000)	NS	
	Baumann et al (2001)	Increased	Nurses who changed units

Outcomes: Effects of hospital restructuring on nursing roles and patient care	Source	Significant Findings	Comment
Perceived medication errors			
Continuity of care	Baumann et al (2001)	NS	Rated low
Actual patient falls	Barry-Walker (2000)	NS	

Table 3: Summary of study outcomes cont'd

Outcomes: Effects of hospital restructuring on relationships with colleagues	Source	Significant Findings	Comment
Social interaction	Barry-Walker (2000)	Decreased	At time of unit merger
	Davidson et al (1997)	Decreased	
Integration of relationships	Blythe et al (2001)	Decreased	
Cohesion of work group relationships	Ingersoll et al (2001)	Decreased	
Time to become part of team	Baumann et al (2001a)	Increased	Nurses in a new role least Nurses who changed units Changing hospitals was greatest
Satisfaction with co-workers	Armstrong-Stassen et al (1996)	Decreased	
Morale	Barry-Walker (2000)	Decreased	In units experiencing most changes
Effects of bumping	Burke & Greenglass (2000b)	Decreased	Longer tenured nurses
	Burke & Greenglass (2001)	NS	Nurses who changed units
	Burke & Greenglass (2000a)	NS	Fulltime vs. part-time nurses

HR – hospital restructuring
NS – not significant
WFC – work family conflict
FWC – family work conflict

Running head: IMPLICATIONS OF YOUR RESEARCH METHOD

Paper #2 - Factor analysis or structural equation modeling?

Theoretical and measurement implications of your research method when studying nursing practice environments.

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Factor analysis or structural equation modeling? Theoretical and measurement implications of your research method when studying nursing practice environments.

Nursing administrators, researchers and nurses themselves have long been concerned about the nature of nursing practice environments. Recently, Aiken and Patrician (2000), Lake (2002), and Estabrooks et al. (2002) have each reported the development of a tool to measure the nursing practice environment, using a variety of factor analytic methods and the Revised Nursing Work Index (NWI-R). The three instruments are substantially different, yet each claims to validly measure the concept of nursing practice environment. The purpose of this study was first, to test these published claims using structural equation modeling (SEM), a method that provides several powerful tests to compare how closely the model/theory, in this case the instrument, fits the data provided by nurses. Second, we developed and tested an alternative model based on theoretical assertions about healthy nursing workplaces, also using SEM. In this paper, we compare the factor analytic and structural equation models, and discuss several theoretical and measurement implications of choosing either research method.

Background

In the 1980's, periods of imbalance between supply and demand of registered nurses were felt acutely in the United States as demand outstripped supply resulting in a severe shortage of nurses. This shortage led to the pioneering magnet-hospital study that examined traits of hospitals that had less difficulty recruiting and retaining registered nurses (McClure, Poulin, Sovie, & Wandelt, 1983; Kramer & Schmalenberg, 1988a). The investigators hypothesized that these hospitals displayed characteristics similar to the best run companies in the corporate community (Kramer & Schmalenberg, 1988a; 1988b) and

that their professional work environments allowed them to attract and retain nurses despite the national shortage (Aiken & Patrician, 2000). Work environment characteristics reported by nursing representatives of these 41 hospitals, were subsequently used by Kramer and Hafner (1989) to develop the Nursing Work Index (NWI), a survey tool to measure hospital nurse job satisfaction. The original tool consisted of 65 items designed to measure work values related to job satisfaction and perceived productivity, staff nurse job satisfaction and staff perception of an environment conducive to quality nursing care. For each item, nurses responded on a 4-point Likert scale to three statements, "This is important to my job satisfaction"; "This is important to my being able to give quality patient care"; and "This factor is present in my current job situation." Scores were summed for individuals across the 65 items or totaled for each item across all cases. Content validity was addressed three ways; extensive review of the literature on job satisfaction and work values, the instrument's development from magnet hospital characteristics, and critique by three of the four magnet hospital researchers (Aiken & Patrician, 2000; Kramer & Hafner). Internal (Cronbach's) alpha reliability coefficients for each subscale ranged from .894 to .928 (Kramer & Hafner).

Cronbach's alpha scores are used to report high internal consistency ("SPSS FAQ," 2002), but are often erroneously equated with how well a group of items measure a single construct. Alpha scores do not indicate whether the factors or latent concepts are the correct number within a model, as high scores can be attained with few or many factors accounting for the same data. Each of the factor models examined in this paper had high alpha scores using the same NWI-R tool and similar data sources. Despite this, the postulated number of factors and their indicators differed substantially and the models

were markedly different in their overall fit to the data. Although we report some alpha scores, we do not rely on these alpha scores to address the appropriateness of the corresponding models or the model's fit with the data. The untrustworthiness of alpha as a demonstration of the adequacy of a measurement scale is but one of the measurement issues that arise when one considers multiple indicator models of latent concepts.

Three Published Factor Analytic Models

Aiken and Patrician's 4-Factor Model

Widespread hospital restructuring in the 1990's led to renewed interest in examining nursing practice environments. To do so, Aiken and Patrician (2000) reported using the NWI in a different way than was originally intended by conceptualizing the unit of analysis as the unit or hospital rather than the individual nurse. This led to the development of the Revised Nursing Work Index (NWI-R). The researchers conceptually examined the original 65 items and eliminated 10 items deemed to be less relevant to the professional nursing work environment, modified one and added two, leaving a 57-item NWI-R. Subscales were then conceptually derived to measure organizational attributes reported in the literature, *autonomy* (5 items), *control over the work environment* (7 items) and *relationships with physicians* (3 items). A fourth subscale was created from items in these 3 subscales to measure *organizational support* for caregivers (Aiken & Patrician). The two statements referring to the importance of each item to job satisfaction and providing quality care were removed leaving only the statement, "The following are present in my current job…". This 4-factor NWI-R tool was used in a national acquired immunodeficiency syndrome (AIDS) care study with a sample of 40 nursing units in 20 hospitals. Ten hospitals had units that provided AIDS care in both dedicated AIDS units

and general medical units. The remaining 10 were selected through a matching procedure. While the response rate was 86%, the actual number of respondents was not reported, nor was any information provided about the process for deriving the subscales aside from conceptual evaluation and validation by magnet hospital researchers. Aiken and Patrician concluded that the NWI-R with its four subscales was a sound instrument for measuring hospital organizational attributes, citing stability based on high response rates (86%), Cronbach's alpha of 0.96 for the overall NWI-R and comparative findings with Kramer and Hafner (Aiken, Smith, & Lake, 1994).

Lake's 5-Factor and Composite Model

Lake (2002) sought to develop a parsimonious, psychometrically sound practice environment scale (PES) with empirically derived subscales using two survey samples of registered nurses. The first was the 1985-86 data from Kramer and Hafner's (1989) study of 16 magnet and 8 non-magnet hospitals (n = 2,299). The second was 11,636 staff nurses from hospitals in Pennsylvania (the US portion of the International Hospital Outcomes Study). This latter sample responded to the NWI-R used by Aiken (Lake).

Lake (2002) undertook the following five procedural steps. First, 49 items from the 65-item NWI that represented the practice environment were selected by two researchers and a staff nurse through consensus. Second, exploratory factor analysis was used to identify subscales or factors representing domains within the practice environment. Orthogonal and oblique rotations were tested following principal axis factoring. Orthogonal (varimax) rotation was found to meet "the most stated criteria" resulting in the choice of a 5-factor model with uncorrelated subscales. The actual "stated criteria" however, were not provided. When the oblique rotation was tested, five items

lost salience, which lowered the subscale reliability to unacceptable levels. A composite measure was then created using the mean of the five subscale scores. These subscales, representing 31 items, included *nurse participation in hospital affairs* (9 items), *nursing foundations for quality of care* (10 items), *nurse manager ability, leadership and support* (5 items), *staffing and resource adequacy* (4 items), and *collegial nurse-physician relations* (3 items). Third, subscale reliability was tested using a Cronbach's alpha criterion over .80. All subscales met the criterion with the exception of *collegial nurse-physician relations* (.71). Fourth, construct validity of the subscales and the composite were evaluated by comparing the scores of nurses in magnet and non-magnet hospital samples. Significant differences were found between these two groups with magnet hospitals reporting higher scores on each subscale. Moderate correlations were reported between the subscales (r = .34-.65). The validity of the composite as a measure of the practice environment was reported by the loading of the five factors onto the single second-order factor, explaining 48% of the variance among the subscales. Last, the generalizability of the selected subscale model was evaluated by oblique multiple-group principal-components cluster analysis. Only one item migrated to another subscale, which was explained by wording changes on a question from the original NWI, shifting the focus from a hospital to a nursing unit context. Lake's final conclusion was that the subscales could be used independently to measure aspects of the practice environment and that the composite measure was a substantively and psychometrically sound alternative to the subscale set.

Estabrooks et al.'s Single-Factor Model

The first Canadian experience with the NWI-R was undertaken in response to Aiken and Patrician's (2000) work using a revised version of their survey tool (Estabrooks et al., 2002). These researchers used a 51-item NWI-R tool in which 49 items came from Aiken and Patrician's tool and two items were added to reflect the Canadian context (see Table 1). The process of moving from Aiken and Patrician's 57-item NWI-R to 49 items, to which the two Canadian questions were added, was not reported. The Canadian study sample was a component of the International Hospital Outcomes Study and was drawn from nurses working in acute care hospitals in Alberta, Ontario and British Columbia. In each province, nurses were accessed through their professional regulatory bodies using annual mandatory reporting information. In Alberta, all registered nurses working in an acute care hospital were invited to participate. In British Columbia and Ontario, a random sample of 100 nurses from each hospital with more than 120 and 100 nurses respectively and all nurses from hospitals with less than 120 / 100 nurses respectively were invited to participate. The final sample of 17,965 (Alberta, 6526, 53%; Ontario, 8778, 57%; British Columbia, 2661, 49%) nurses represented 415 hospitals (Estabrooks et al.).

Following survey completion, eight items from the 51-item NWI-R were removed leaving 43 items for analysis. Specifically, item 13 was not included in the British Columbia survey; item 41 had an unusually low response rate in Ontario; items 5, 42, 43, 48, 50, and 51 were excluded in discussion with Aiken's Pennsylvania research team. After listwise deletion, 13,185 cases remained (Estabrooks et al., 2002).

Estabrooks' (2002) team used exploratory principal components factor analysis (PCA) with an orthogonal rotation. Items with loadings greater than 0.5 were used for factor interpretation. PCA was initially performed on each of the provincial datasets with similar solutions, leading to subsequent analyses on the pooled Canadian dataset. Nine factors were identified accounting for 54% of the variance. The first factor (items 12, 16, 1 and 11) accounted for 25.1% of the variance and the remaining factors less than 6% each. Three items in the first factor were found in Aiken and Patrician's (2000) *control over the practice setting* which included 4 additional items (Estabrooks et al.). The large gap in variance accounted for by the first factor compared to the remainder led to a second PCA in which a one-factor solution was forced. Twenty-six items with loadings greater then 0.5 comprised the single factor that the Estabrooks team labeled the *practice environment.* Reliability had been evaluated by calculating Cronbach's alpha on Aiken and Patrician's conceptually derived subscales (0.75 to 0.83), their own nine-factor solution (0.24 to 0.85) and their single factor solution (0.93).

Reconstruction and Reassessment of the Factor Models

Estabrooks et al.'s Single-Factor Model Revisited

We reconstructed and estimated a single factor spanning 26 indicators as a structural equation model using LISREL (Jöreskog & Sörbom, 1996) and the pooled Canadian dataset (see Figure 1). This dataset now contained 17,403 cases rather the 17,965 cases used by Estabrooks' team, due to additional data cleaning to remove duplicate cases (Estabrooks et al., personal communication, 2002). Listwise deletion left 12,780 (compared to 13,185) cases. The results showed nine indicators with loadings greater than 0.5, eleven with loadings between 0.4 and 0.5, and six below 0.4. The

differences between these loadings and those reported by Estabrooks et al., is partially explained by their use of PCA, where the components/factors are required to be the full and entire source of both the item covariances and variances, thereby implicitly excluding unique item-specific error variables (Jöreskog & Sörbom, 1979).

The explained variance (R^2) for each individual indicator ranged from 0.209 to 0.436. The chi-square for this model was 38,590.29 ($p = 0.00$) and the adjusted goodness of fit (AGFI) was 0.751, indicating a clear unacceptable model fit with the data (Hayduk, 1987). The model's degrees of freedom (df) were 299, indicating a parsimonious model at the measurement level. See Table 2 for characteristics and testing results for this and all subsequent models. Large standardized residuals (the largest being 72 standard deviations) were scattered throughout the matrix suggesting that a few model modifications would not be sufficient to obtain an acceptable model fit. In fact, even after permitting 25 modifications, allowing correlations between the errors on various indicators of the single factor, the chi square dropped to 7,284.14, an indication of persistent and substantial ill fit ($p = 0.00$, $df = 274$). At this point, the modification indices reported that the next 12 most important modifications would result in approximately an 1,800-point reduction in chi square, which would still have left a substantially ill fitting model. Modifications to any model are only recommended if they have a theoretical basis and are reasonable given the theory being assessed (Hayduk, 1987). None of these modifications were made with specific theoretical implications in mind. Despite using the most fit-improving (though not theoretically appropriate) modifications, no acceptable chi-square was found. Therefore the model claiming that 26 indicators reflect a single common factor was not supported. It may be argued that the

large sample size affected model fit in that with a large sample size, even small differences between the model and the data may be detectable as more than mere sampling fluctuations (Hayduk, 1987). However the critical number[1] of cases for this model is 119, meaning that even with a sample size as small as 119, the observed differences between the model and the data were still significantly larger than what could be reasonably attributed to sampling fluctuations.

Lake's 5-Factor and Composite Models Revisited

Lake's (2002) empirically derived 5-factor model, with 31 indicators and no cross loadings, was also estimated as a factor model utilizing the pooled Canadian dataset (see Figure 2). As we used the same 43-item NWI-R as Estabrooks (2002) team, 4 items in Lake's original work were missing. This left 27 indicators in the reconstructed model, 8 items (rather than 9) in *nurse participation in hospital affairs,* 9 items (rather than 10) in *nursing foundations for quality of care,* and 3 items (rather than 5) in *nurse manager ability, leadership and support.* Consistent with Lake's report, the five factors were not permitted to correlate nor were cross loadings permitted between subscales. All measurement errors of the indicators were left free for estimation. Omitting an item meant that our testing missed whatever ill fit might have arisen due to the omitted items. Inclusion of the additional items could not undo, or nullify, any ill fit found for the included items. That is, more items might make the model fit worse, and could not have made the model fit better, than the following model tests indicate. The chi-square for this model was 37,352.06 ($p = 0.00$, $df = 324$) and the AGFI was 0.757, indicating an

[1] Critical-N is the size of the sample that would be required to make the observed difference between the data-implied matrix and the theory-implied matrix just significant, at a typical critical level of significance such as 0.05. This is important because with larger sample sizes, smaller differences are detectable as being more than mere sampling fluctuations (Hayduk, 1987, p. 168).

unacceptable model fit with the data (Hayduk, 1987). Large standardized residuals (the largest being 61.5 standard deviations) were scattered throughout the matrix, suggesting again that a few modifications would not be sufficient to obtain acceptable model fit.

Modification indices were highest in areas suggesting a need for correlations between all five factors. Therefore we reran the model allowing correlations between the factors that Lake (2002) had viewed as uncorrelated. With the 10 additional factor inter-correlations in the model, chi-square dropped by 50% to 17,376.23 (P = 0.00, df = 314) and the AGFI rose to 0.880. Although the model still did not fit, the large drop in chi-square was evidence that correlations between the factors were required. This contradicted Lake's assertion of factor independence. Remaining potential modifications to improve model fit would further contravene Lake's factor analytic structure. These modifications would add cross loading of the indicators, or allow correlations among the error variables on the indicators.

A second model was reconstructed showing the relationship of Lake's (2002) composite measure (Practice Environment) to the five factors loading on that overarching factor (see Figure 3). The chi-square for this model was 17,872.73 (p = 0.00, df = 319) and the AGFI was 0.877, again indicating the model did not fit the data. In fact, the model fit was substantively similar to that of the correlated 5-factor model, because the second-order factor (which corresponds to Lake's composite measure) acted to create correlations among the five factors. After 15 model modifications prompted by indices to improve model fit, primarily freeing correlations between indicator errors, the lowest chi-square achieved was 7,099.74 (p = 0.00, df = 304) and an AGFI of .948. Therefore Lake's models, whether they had five uncorrelated factors, five correlated factors, or five

factors correlated by a composite factor, and supplemented with multiple opportunistic error covariances, were ill fitting and not supported. The R^2 for indicator loadings for each factor ranged as follows — *nurse participation in hospital affairs* (.270 – .594), *nursing foundations for quality of care* (.265 – .554), *nurse manager ability, leadership and support* .620 – .659), *staffing and resources* (.572 – .697) and *nurse/physician relationships* (.539 – .690). The third, fourth and fifth factors had the most consistent loadings, all of which were above 0.5. It might be argued that the large sample size affected model fit; however the critical number of cases for this model was 656, indicating that even with this small a sample size, the observed differences between the model and the data would have been detected as being significant and not mere sampling fluctuations.

Aiken and Patrician's 4-Factor Model Revisited

Aiken and Patrician's (2000) conceptually derived 4-factor model with its 13 indicators and multiple cross loadings was similarly estimated as a factor model utilizing the pooled Canadian dataset (see Figure 4). As the 43-item NWI-R was used again, two items were missing from Aiken and Patrician's original work. The unavailability of the two items left five items (rather than six) in *control over the practice setting* and eight items (rather than nine) in *organizational support*. The four factors were permitted to correlate and all measurement errors for the indicators were left free for estimation. The chi-square for this model was 939.12 ($p = 0.00$, $df = 50$) and the AGFI was 0.979, indicating better but still unacceptable model fit with the data (Hayduk, 1987). Large standardized residuals (the largest being 9.3 standard deviations) were scattered throughout the matrix of standardized residuals suggesting that more than a few

modifications would be required to obtain acceptable model fit. The potential modifications to improve model fit all contravened the theoretical conceptualization proposed by Aiken and Patrician by adding further "cross loadings", or correlations among the error variables on the indicators. Since there were no theoretically acceptable modifications, and since multiple purely fit-driven modifications would have been required, we conclude that Aiken and Patrician's model failed to fit the data, even if it was better fitting than Estabrooks' (2002) or Lake's (2002) model. The R^2 for indicator loadings for each factor ranged as follows — *autonomy* (–.011 – 0.773), *control* (0.086 – 0.840), *nurse/physician relationships* (0.530 – 0.689) and *organizational support* (–0.034 – 0.547). The third factor, *nurse/physician relationships,* had the most consistent loadings, all of which were above 0.5. Only two of the five indicators of *autonomy* loaded above 0.5 and two loadings were negative, despite all indicators being coded to represent greater degrees of autonomy with higher scores. Two of the five *control over the practice setting* indicators loaded above 0.5. The factor that held together least well was *organizational support* in which one of the eight loadings was above 0.5 and two were negative. These results were completely inconsistent with Aiken and Patrician's theoretical conceptualizations and would be sufficient to disallow their 4-factor model even if a fitting model had been achieved.

Structural Equation Models

We approached the NWI-R using a different research method, structural equation modeling (SEM), to examine causal relationships within nursing practice environments. Effective use of SEM requires that the researcher first develop a full theoretical model (not just a factor model), which is then tested against the data. Measurement alone, even

multiple supposedly measured "factors", without an explicit theory coordinating the measured concepts, is insufficient.

SEM Model 1

We developed a theoretical conception of the causal relationships in the nursing practice environment, based on an extensive review of the literature and two decades of experience by the first author. We asserted that the infrastructure that allowed nurses to gain increased familiarity in their environment, the organization's concern for staff development, collaboration with physicians, sufficient staffing resources, professional practice support and supervisory support would result in improved relationships between management and staff, enhanced staff participation in scheduling, perceptions of increased competence among nursing colleagues, increased nurse autonomy and recognition, and the ability to spend more time with patients. Additionally, increased competence of colleagues would result in enhanced recognition, which would further enhance management/staff relationships. These relationships would increase nurse autonomy, staff involvement in scheduling, and the ability to spend time with patients. The full model is depicted in Figure 5.

In order to use a similar number of indicators as Estabrooks et al. (2002), we initially used two indicators for each of the 13 latent concepts. The indicator that best reflected each concept (based on a match between item wording and our theoretical understanding, adequate variances, and item clarity) was used to specify and scale the latent concept through a fixed 1.0 loading and a fixed measurement error variance as detailed in Table 3. The R^2 for each of the second (estimated) indicators ranged from a dismal 0.038, to 0.749. The chi-square for this model was 25,825.08 ($p = 0.00$, $df = 270$)

and the AGFI was 0.797, indicating that the model did not fit the data. Standardized residuals were scattered throughout the residual matrix, and significant gaps between the first and second indicators (in terms of R^2, loading, and standardized residuals) were noted. The concept, "*sufficient staff for workload*", had the best pair of indicators: *enough staff to get the job done* (item 16) and *enough registered nurses to provide quality care* (item 12). The concept "*familiarity with the practice environment*" had the worst pair of indicators: *staff nurses do not have to float off their designated unit* (item 46) and *patient care assignments that foster continuity of care* (item 45). The indicator diagnostics showed that many of the initially paired indicators were actually better indicators of two seemingly unrelated latent concepts. Since it was clear that second-indicators overall were not working in coordination with the measures we had judged to be the very best indicators, a second model was developed that maintained the same theory but used only the one best indicator of each latent concept.

SEM Model 2

This second model used the same latent theoretical concepts, and causal coordination between the concepts, as the initial structural equation model (see Figure 6). The latent concepts were scaled and had their meanings asserted via exactly the same measurement specifications reported in Table 3. With the second-indicators omitted, the model's chi-square dropped dramatically to 3,179.12 ($p = 0.00$, $df = 36$) indicating a better, but still not adequately fitting model.

We had been overly conservative in postulating effects in the initial model; hence it was reasonable to consider adding some effects into the model. After carefully studying the theoretical components of the model, twelve sequential modifications were made

based on assertions that were consistent with the initial theoretical framework. Four more predictive effects were added to *recognition*, three more to *management/staff relationships*, two more to *staff involvement in scheduling*, and one effect was added to *nurse autonomy*. The direction of the effect between autonomy and collaboration was reversed, and a correlation of the errors on *nurse autonomy* and *staff involvement in scheduling* was allowed as these two concepts both reflect different types of nurse decision-making (see Figure 7 for the final version of SEM model 2). No changes were made to the measurement structure of the model.

The chi-square of this model was 353.91 ($p = 0.00$, $df = 24$) with an AGFI of 0.984. This was by far the best fit of any of the models but still indicated significant ill fit. The R^2 for each of the indicators ranged from 0.749 to 0.980 as a consequence of the relationships we asserted between the concepts and their indicators. The R^2 for each latent concept was small because most of the effects between the latent concepts were small, even though all were statistically significant.

SEM Model 3

In order to reexamine the measurement portion of this model, we completed a series of runs testing whether adding the second indicator of each latent concept individually improved or degraded model fit. The changes in chi-square and in the magnitude or significance of beta or gamma effects are reported in Table 4. The results of these analyses were consistent with our earlier findings. The model chi-square jumped markedly with the addition of each second indicator, with the exception of the pair of items noted earlier for "sufficient staff for workload". However, even this best behaved of the indicator pairs resulted in a substantial reduction in model fit. Only slight changes

in beta or gamma effects were noted, and there were no changes in the significance of the effects among the latents for any of these 13 runs.

Discussion

Model Failings

To contextualize our results, let us briefly reconsider each of the models we investigated. First, Estabrooks et al.'s (2002) single factor model was primarily a "measurement model" based on the use of exploratory PCA. While their conclusions were appropriate if examined purely on the basis of traditional factor analytic specifications, the model failed when confronted with the chi-square model test. This model could not have failed due to inadequate theory; it was not based on a theoretical model. It failed for purely measurement reasons. The data simply did not comply with the proportionality constraints that are implicit in seeking multiple indicators for a single concept (Hayduk, 1996). The usefulness of undertaking a traditional factor analytic exploratory process to locate a common factor underlying 26 items of the NWI-R is seriously questioned.

Similarly, Lake's (2002) independent factors model also failed for measurement reasons — reasons that slipped passed the checks and rules of thumb provided by traditional factor analytic procedures. Lake's initial model was not primarily driven by theory (statistically independent variables do not permit theoretical integration), but by traditional "measurement" policies, and it is the utility of these traditional ways of proceeding that is questioned by the failure of Lake's initial model.

Lake (2002) may have attempted to add a substantial theoretical component by requiring that the five factors respond to a single underlying construct of "practice

environment". Unfortunately the addition of this theoretical claim demanded coordination among the five factors, which contradicted Lake's initial assertion of subscale independence. Covariances among the five latent concepts were required if those latents were viewed as arising from a common factor. Thus, Aiken and Patrician's (2000) and Lake's models failed for both theoretical and measurement reasons. One style of theoretical failing was evident in Aiken and Patrician's indicators not loading on the factors as conceptually derived. Aiken and Patrician's multiple cross loadings muddied the meaning of the concepts and forced the loadings to be smaller (and even inexplicably negative) but this did not contribute to model ill fit. It was the continuing need for additional loadings and for measurement error covariances that evidence this. A second style of theoretical failing arose from the inability of Lake's second-order-factor to adequately account for the coordination among the five original latent concepts. This failure was evidenced by the fact that the model with five correlated factors fit much better than the model with one overarching factor.

Our first structural equation model also failed for both theoretical and measurement reasons — the theory was too sparse and the pairs of indicators were not sufficiently similar to act as multiple indicators of single latent concepts. In our second model, we initially eliminated the multiple-indicator measurement issues by dropping the second indicator, thereby tying the meaning of each latent concept to the single best indicator. Then we expanded on our "initially conservative" theory by asserting effects that should have been included from the beginning. These corrections led to a much better fitting and hopefully more useful model than any of the factor models. Though the fit of this model was nowhere near as bad as the fit of the prior models, the fit remained

significantly problematic and hence the possibility of causal misspecifications remained a serious theoretical concern. The use of single indicators minimized measurement excuses for ill fit, so some theoretical failings were the most likely culprit. Our final sequence of 13 models made a pairwise reassessment of the indicators and we found that each and every pair of indicators resulted in substantial signs of ill fit. Thus the idea that "common latent factors" underlie the items is confronted by the data, all the way down to each and every non-cooperative pair of items. This is evidence that even the most similar pairs of indicators seem not to tap into a shared underlying theoretical concept. Each of the items seem to tap into distinct, even if closely theoretically related, latent concepts.

Factor Models Versus Structural Equation Models

Ideology. The major contention between factor models and structural equation models rests with the researcher's preconceptions about the relationship between theory and data. SEM methodology holds that theory drives the research process. Factor analytic methodology begins with data correlations followed by the application of theoretical threads to contextualize findings. Much of the theory within nursing as a discipline is based on grand theorizing about the nature of human beings (ontology) and how we come to know things or generate new knowledge (epistemology) within the context of promoting and achieving health. While these grand theories or conceptual frameworks are useful for describing and conceptualizing phenomena of interest, they are not particularly helpful in determining why events or outcomes occur. The development and testing of theory surrounding everyday practices within nursing is vital to determining and measuring causal relationships that will lead to predicting, and hopefully improving, patient outcomes. This requires that researchers unearth their assumptions and traditions,

and steadfastly commit to the empirical implications of their theoretical models while at the same time remaining open to the potential fallibility of their theory. Ideology, assumptions, beliefs and experience drive what we measure. As researchers, it is incumbent on us to use methods that allow us to test our theories about the world. Data do not speak for themselves.

Multiple indicators and measurement. Factor analysis attempts to explain correlations between items by introducing factors that account for the between-item correlations (Jöreskog & Sörbom, 1979). Each factor is deemed to "cause" several indicators, and the covariance between any pair of indicators must equal the product of three things — the magnitudes of the effects (loadings) leading from the common cause (factor) to the two indicators, and the variance of the common cause (Hayduk, 1996). This coordination demands a proportionality between the observed loadings and the indicator covariances; a coordination which cannot be avoided by adding more indicators (Hayduk, 1996). The real world does not behave that way; hence models with multiple indicators tend to fail — whether Aiken and Patrician's (2000) five indicators of *autonomy* or our structural equation model with paired indicators. Moving to single indicators permits each indicator to report on a unique and distinct latent concept and thereby avoids the problematic proportionality requirements (Ratner, Bottorff, Johnson, & Hayduk, 1996).

The three factor-analytic models all contain multiple indicators of each concept, yet these multiple indicators acted differently primarily due to the differential groupings of items and the many cross loadings in Aiken and Patrician's (2000) model. In Aiken and Patrician's 4-factor model, each indicator loaded on several factors. Cross loadings

lead to less distinct meanings of the factors, and post-hoc cross loadings alter the factors' meanings so that they no longer correspond to how the factors were originally conceived. SEM is capable of cleaning up this complexity of meanings by providing more tightly coordinated relationships between each of the latent concepts and its indicator. The specified measurement error variances, the specified relationships between latent concepts, and also the specified lack thereof, are theoretical and methodological assertions that permit the researcher to control the meanings of the concepts, such that they hopefully become the proper concepts to include in the model (Hayduk & Glaser, 2000a; 2000b).

Degrees of freedom. Models such as the single or 5-factor models have many degrees of freedom because they have few factors spanning many indicators. However this measurement parsimony is achieved by sacrificing theory, the emphasis being on measurement at the expense of theory. Notice that SEM model 1 had virtually the same degrees of freedom yet had many fewer indicators per concept. In this model, substantial theoretical parsimony was achieved by having relatively few effects connect the increased number of latent concepts.

Proper number of underlying factors. How many concepts or factors is the right number? Lake's (2002) empirically derived 5-factor solution with its overarching single factor, and Estabrooks' (2002) unitary factor both followed Aiken and Patrician's (2000) work on four conceptually derived factors. The question of how many factors is the correct number will not be sorted out by repeated attempts at using factor analysis. Using a real world model to test theory and assumptions about relationships that do, and do not, exist will provide a more substantially justifiable way to determine the appropriate

number of concepts (Hayduk & Glaser, 2000b). The irony is that even by sticking to the once-traditional factor analytic guidelines of retaining only the very best factors with eigenvalues greater then 1.0 and loadings greater than 0.5 (Streiner & Streiner, 1986), the model's fit can be dismal and the number of latent factors far from the number required to match up with the causal world influencing the responses to the items. Retaining factor cross loadings less than 0.5 might improve model fit, but would breach factor analysis guidelines and would tend to make each item a measure of more than one latent concept.

Conclusion

The need for research into nursing practice environments is as pressing now after a decade of hospital restructuring, as ever, and choosing valid and reliable research methods with which to study practice environments are of central importance. The profound impact that ideology can have on a researcher's approach and results cannot be underestimated. In this project, three published factor analytic models designed to measure the practice environment were estimated and tested to determine their fit with data. All three factor analytic models failed significantly for both measurement and theoretical reasons. The failure of these models when subjected to the chi-square test stands in stark contrast to the reported claims that these scales and subscales are adequate and appropriate measures of the practice environment. The structural equation model also failed although its diagnostics showed a closer fit of theoretical assertions to data. This model's theory included assertions about how specific kinds of resources, including supervisory support, education, collegial relationships, and staffing influence nurses' recognition, decision-making autonomy, and ultimately the time available to nurses to provide quality patient care.

Our purpose was to test existing and new assertions about the measurement of the nursing practice environment. Our analyses assert that the concept of the nursing practice environment is poorly specified and inadequately measured. We propose that the most useful advances in ongoing development of the concept of nursing practice environment will result from testing clearly specified causal relationships using powerful methods such as structural equation modeling.

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Table 1

NWI-R Questionnaire

	The following are present in your current job . . .	**Strongly Agree**	**Somewhat Agree**	**Somewhat Disagree**	**Strongly Disagree**
1.	Adequate support services allow me to spend time with my patients.	1	2	3	4
2.	Physicians and nurses have good working relationships.	1	2	3	4
3.	A good orientation program for newly employed nurses.	1	2	3	4
4.	A supervisory staff that is supportive of the nurses.	1	2	3	4
5.	A satisfactory salary.	1	2	3	4
6.	Nursing controls its own practice	1	2	3	4
7.	Active staff development or continuing education programs for nurses.	1	2	3	4
8.	Career development/clinical ladder opportunity.	1	2	3	4
9.	Opportunity for staff nurses to participate in policy decisions.	1	2	3	4
10.	Support for new and innovative ideas about patient care.	1	2	3	4
11.	Enough time and opportunity to discuss patient care problems with other nurses.	1	2	3	4
12.	Enough registered nurses on staff to provide quality patient care.	1	2	3	4
13.	A nurse manager or immediate supervisor who is a good manager and leader.	1	2	3	4
14.	A senior nursing administrator who is highly visible and accessible to staff.	1	2	3	4
15.	Flexible or modified work schedules are available.	1	2	3	4
16.	Enough staff to get work done.	1	2	3	4
17.	Freedom to make important patient care and work decisions.	1	2	3	4
18.	Praise and recognition for a job well done.	1	2	3	4

	The following are present in your current job . . .	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
19.	The opportunity for staff nurses to consult with clinical nurse specialists or expert nurse clinicians/educators.	1	2	3	4
20.	Good working relationships with other hospital departments or programmes.	1	2	3	4
21.	Not being placed in a position of having to do things that are against my nursing judgment.	1	2	3	4
22.	High standards of nursing care are expected by the administration.	1	2	3	4
23.	A senior nursing administrator equal in power and authority to other top level hospital executives	1	2	3	4
24.	A lot of team work between nurses and physicians.	1	2	3	4
25.	Physicians give high quality medical care.	1	2	3	4
26.	Opportunities for advancement.	1	2	3	4
27.	Nursing staff are supported in pursuing degrees in nursing.	1	2	3	4
28.	A clear philosophy of nursing that pervades the patient care environment.	1	2	3	4
29.	Nurses actively participate in efforts to control costs.	1	2	3	4
30.	Working with nurses who are clinically competent.	1	2	3	4
31.	The nursing staff participates in selecting new equipment.	1	2	3	4
32.	A manager or supervisor who backs up the nursing staff in decision-making, even if the conflict is with a physician.	1	2	3	4
33.	Administration that listens and responds to employee concerns.	1	2	3	4
34.	An active quality assurance program.	1	2	3	4
35.	Staff nurses are involved in the internal governance of the hospital (e.g., practice and policy committees).	1	2	3	4
36.	Collaboration between nurses and physicians.	1	2	3	4

	The following are present in your current job . . .	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
37.	A preceptor program for newly hired RNs.	1	2	3	4
38.	Nursing care is based on a nursing rather than a medical model.	1	2	3	4
39.	Staff nurses have the opportunity to serve on hospital and nursing committees.	1	2	3	4
40.	The contributions that nurses make to patient care are publicly acknowledged.	1	2	3	4
41.	Nurse managers or clinical supervisors consult with staff on daily problems and procedures.	1	2	3	4
42.	A work environment that is pleasant, attractive, and comfortable.	1	2	3	4
43.	Opportunity to work on a highly specialized patient care unit.	1	2	3	4
44.	Written, up-to-date nursing care plans for all patients.	1	2	3	4
45.	Patient care assignments that foster continuity of care, i.e., the same nurse cares for the patient from one day to the next.	1	2	3	4
46.	Staff nurses do not have to float from their designated unit.	1	2	3	4
47.	Staff nurses actively participate in developing their own work schedules (i.e., what days they work, days off, etc.)	1	2	3	4
48.	Each patient care unit determines its own policies and procedures.	1	2	3	4
49.	Working with experienced nurses who know the hospital system.	1	2	3	4
50.	RNs and LPNs have good working relationships.	1	2	3	4
51.	RNs and unlicensed assistive personnel (e.g., nursing aides, nursing assistants, etc.) have good working relationships.	1	2	3	4

Table 2

Characteristics and Test Results of Factor Analytic and Structural Equation Models

Author and Run	Original model N	Reconstructed model N	R^2 of indicators	χ^2	p value	df	AGFI	Model fit	Standardized residuals (largest SD)	Critical N
Estabrooks et al. (2002)										
1st run	13,185	12,780	0.209-0.436	38,590.29	0.0	299	0.751	Unacceptable	Scattered 72	119
after 25 modifications	13,185	12,780	0.211-.448	7,284.14	0.0	274	0.942	Unacceptable	Scattered 19	582
Lake (2002)										
1st run	11,636	12,780	0.139-0.756	37,352.06	0.0	324	0.757	Unacceptable	Scattered 61.5	656
allowing correlations between 5 factors	11,636	12,780	0.131-0.752	17,376.23	0.0	314	0.880	Unacceptable	Scattered 41.7	277
with overarching PES factor	11,636	12,780	0.133-0.754	17,872.73	0.0	319	0.877	Unacceptable	Scattered 42.4	273
after 15 additional modifications	11,636	12,780	0.138-0.698	7,099.74	0.0	304	0.948	Unacceptable	Scattered 21.0	657
Aiken & Patrician (2000)										
1st run	Not reported	12,780	0.141-0.782	939.12	0.0	50	0.979	Unacceptable	Scattered 9.3	1037
SEM 1										
1st run	NA	12,780	0.038-0.749	25,825.08	0.0	270	0.797	Unacceptable	Scattered 47.2	163
SEM 2										
2nd run	NA	12,780	0.749-0.980	3,179.12	0.0	36	0.909	Unacceptable	Scattered 33.8	237
after 12 theory-based modifications	NA	12,780	0.749-0.980	353.91	0.0	24	0.984	Unacceptable	Scattered 7.4	1552

Note: R^2 = explained variance. AGFI = Adjusted Goodness of Fit Index.

Table 3

Measurement Error Specification for the Latent Variables in the Structural Equation Models

Variable	% assessed as measurement error	Variance from the covariance matrix	Error variance
y1 nrscomp	2.5%	0.503	.01257
y3 praise	2.5%	0.805	.02012
y5 admnlis	15%	0.722	.1083
y7 freedom	2%	0.583	.01166
y9 schdule	5%	1.050	.0525
y11 support	7.5%	0.772	.0579
x1 cntined	25%	0.858	.2145
x3 program	15%	0.830	.1245
x5 nvrflt	5%	1.132	.0566
x7 jntprac	5%	0.503	.02515
x9 superv	7.5%	0.854	.06405
x11 nrsspec	20%	0.915	.1830
x13 staff	20%	0.768	.1536

Table 4

Model Fit When Adding Second Indicators

Model Indicator	Second Indicator	χ^2	df	Change in Effects		
				γ	β	Significance
Model with single indicators		353.9	24			
x1 contined	supdeg	1371.5	36	<10% Δ		no Δ
x2 program	precep	1150.5	36	<10% Δ		no Δ
x3 nvrfloat	samenrs	1866.0	36	<10% Δ		no Δ
x4 jntprac	teamwork	1051.2	36	<10% Δ		no Δ
x5 superv	headsup	1681.6	36	<10% Δ		no Δ
x6 nrspec	ideas	5018.9	36	<10% Δ		no Δ
x7 staff	enough	418.7	36	<10% Δ		no Δ
y1 nrscomp	expnrs	1296.8	36		no Δ	no Δ
y2 praise	acknowl	1529.9	36		<10% Δ	no Δ
y3 adminlis	jdgment	2075.6	36		<10% Δ	no Δ
y4 freedom	control	1933.7	36		<10% Δ	no Δ
y5 schdule	equipmn	2769.6	36		<10% Δ	no Δ
y6 support	problem	2495.7	36		<10% Δ	no Δ

Figure 1. Estabrooks et al.'s One Factor Model

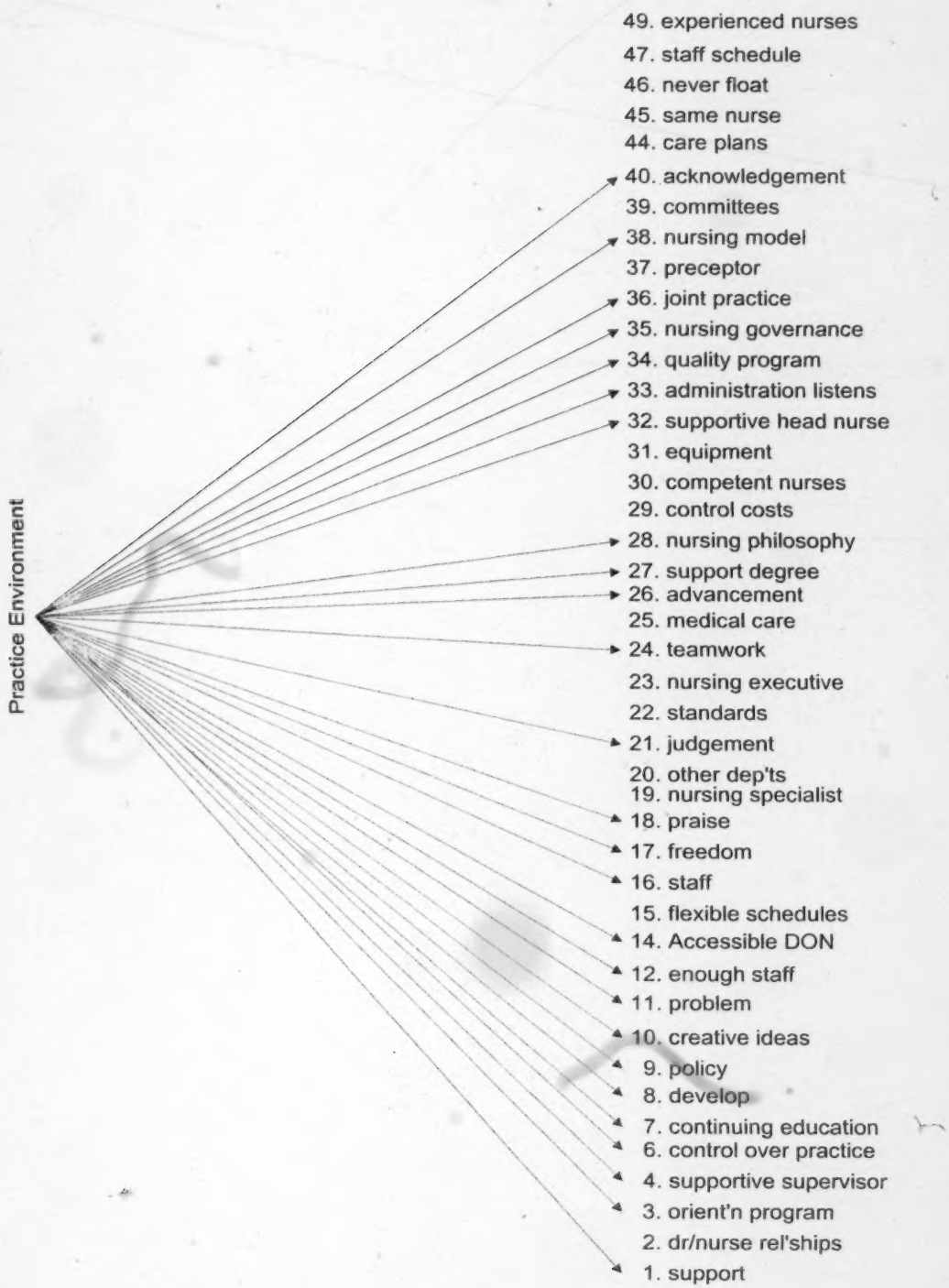


Figure 2. Lake's Five Factor Model

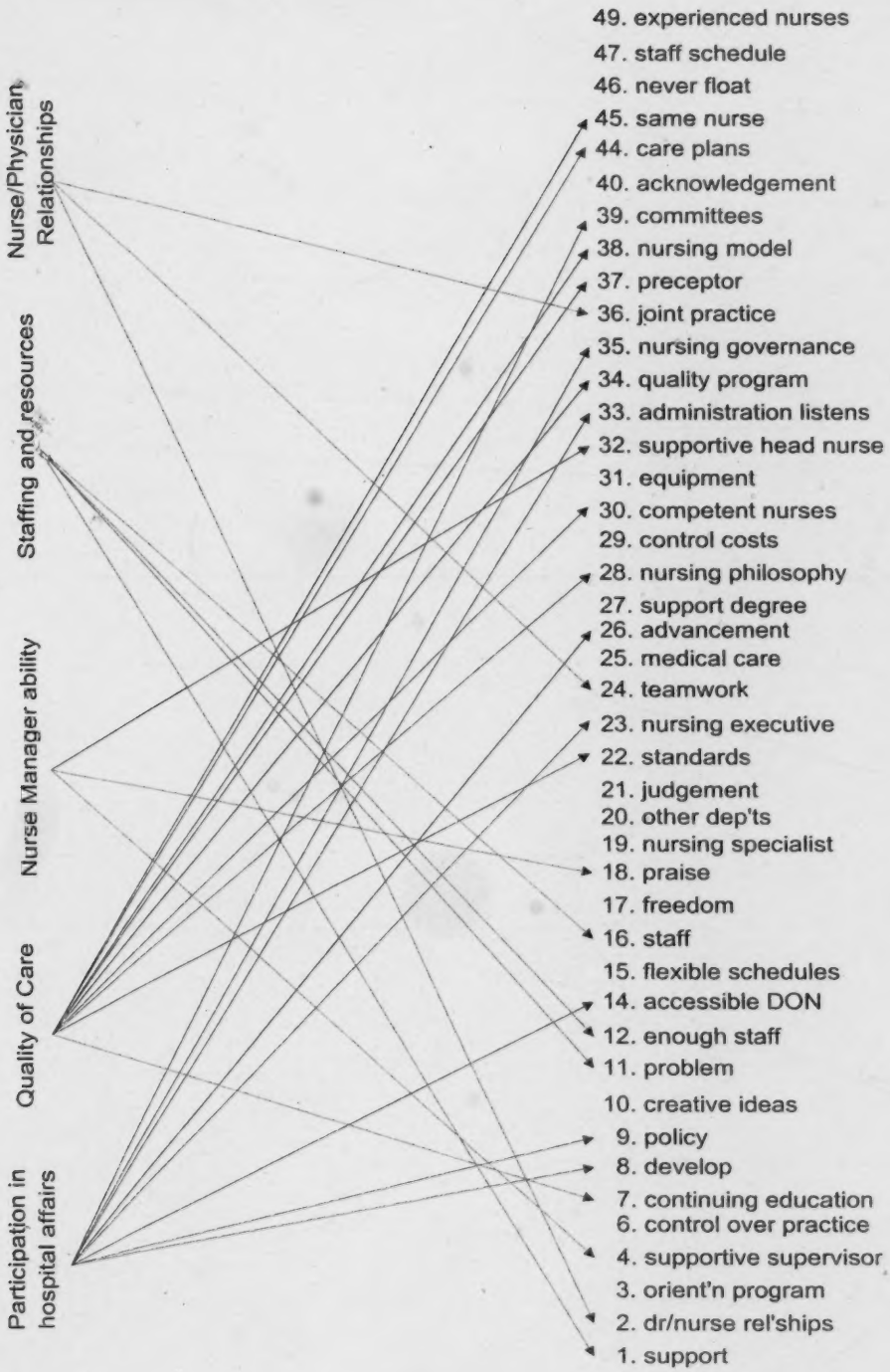


Figure 3. Lake's Composite Model

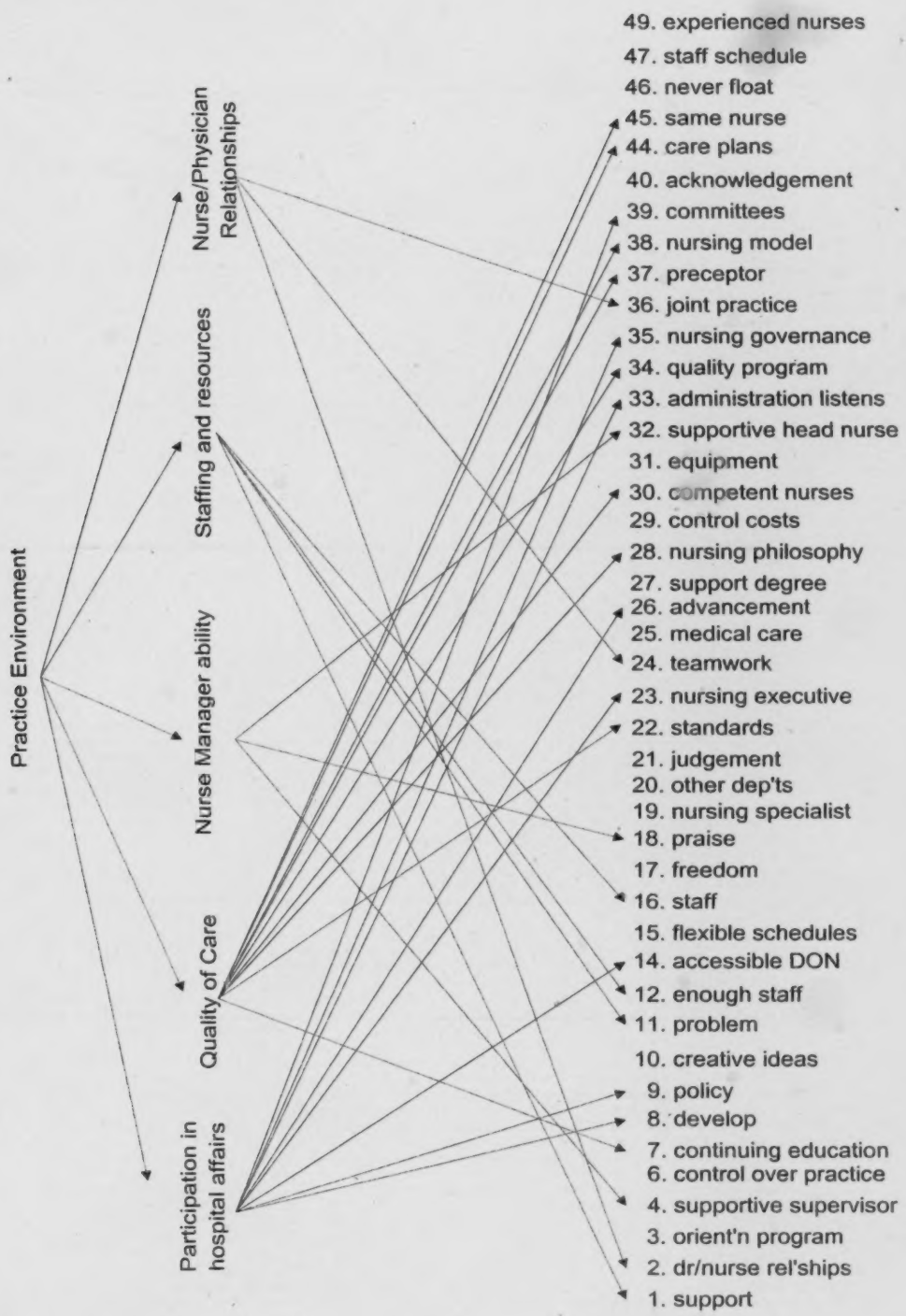


Figure 4. Aiken and Patrician's Four-Factor Model

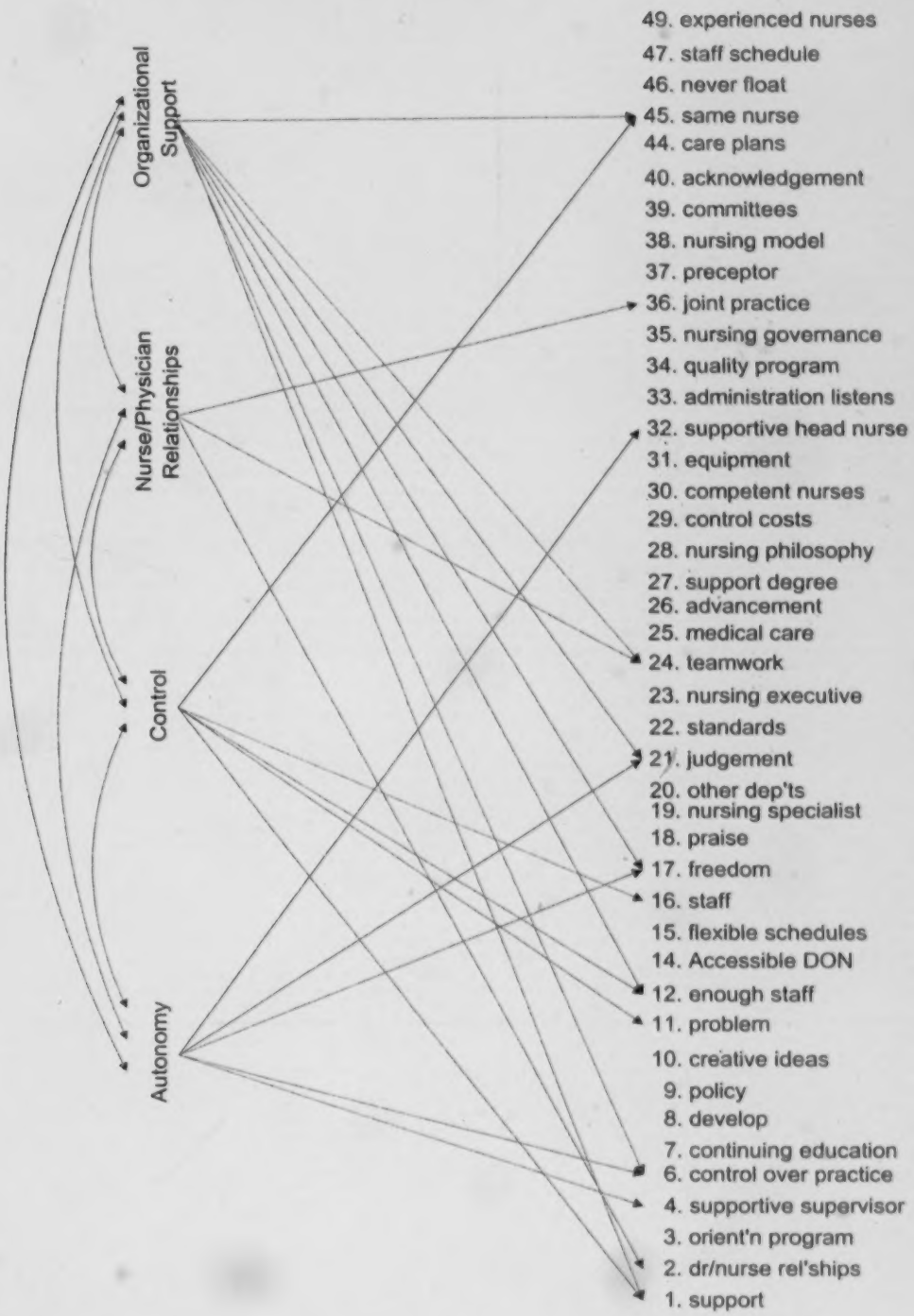


Figure 5. SEM Model 1

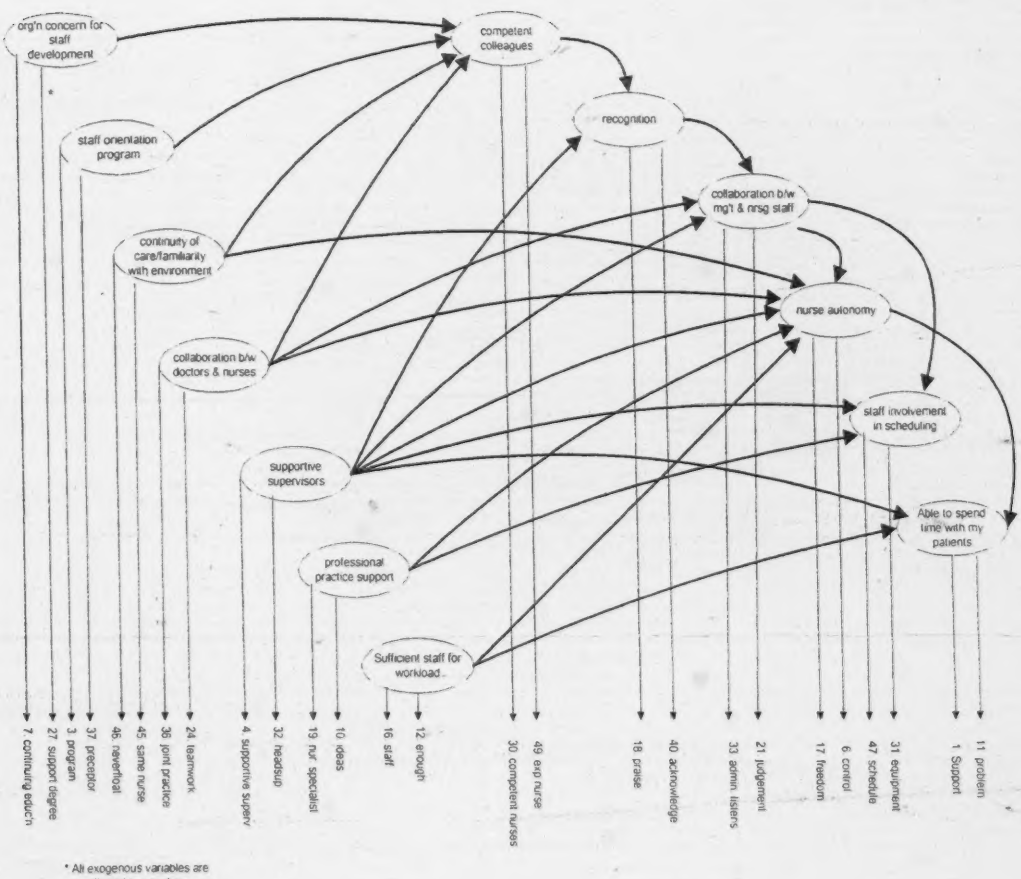


Figure 6. SEM Model 2

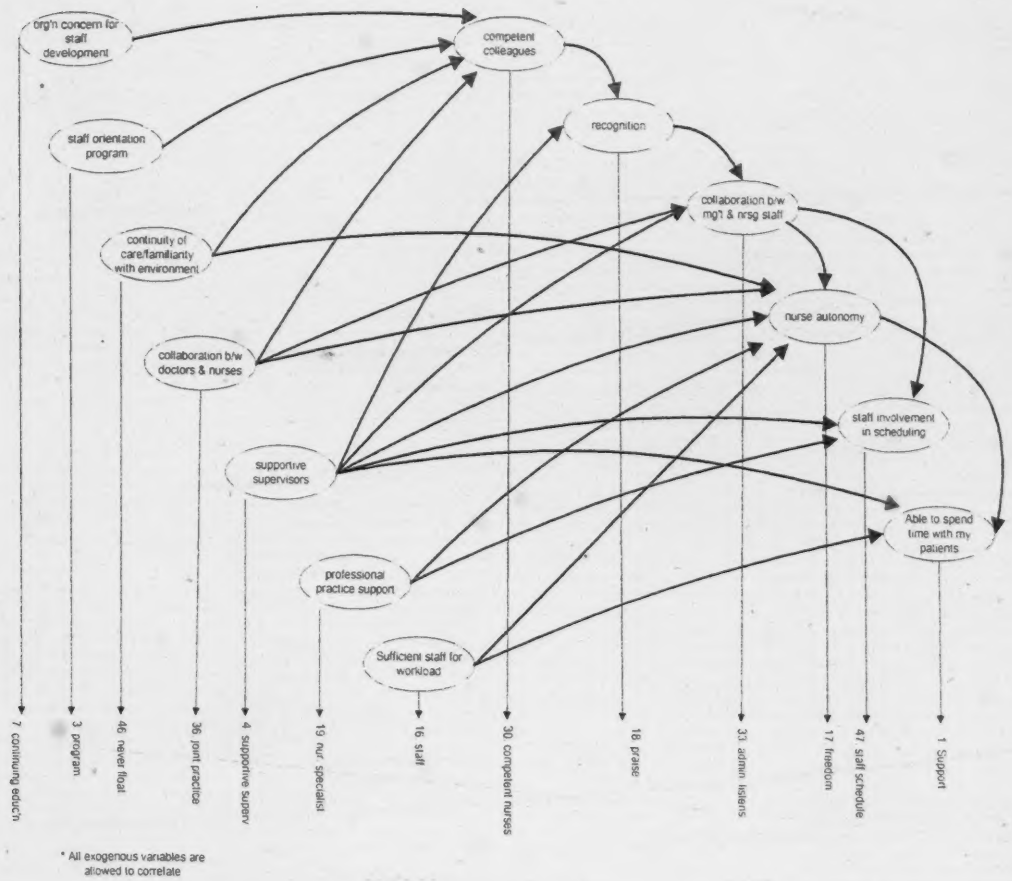
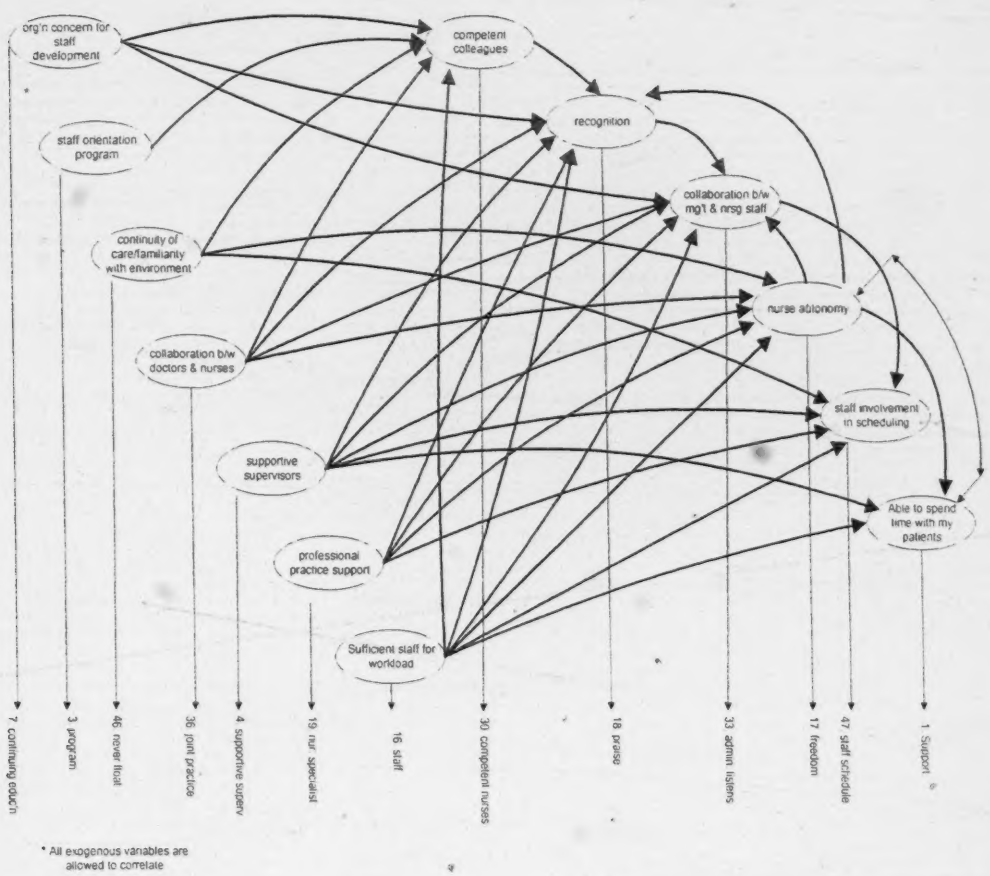


Figure 7. SEM Model 2 Final



Running head: LEADERSHIP STYLES

Paper #3 - Mitigating the effects of hospital restructuring on nurses: The responsibility of emotionally intelligent leadership

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Keywords: hospital restructuring, leadership, emotional intelligence, effects, structural equation modeling, mitigation

Introduction

A decade of North American hospital restructuring in the 1990s resulted in the layoff of thousands of nurses, leading to documented negative physical and emotional health effects for nurses who remained employed, in addition to significant reductions in job satisfaction and quality of care (Cummings & Estabrooks, 2003). It is clear that the negative impacts on nurses carried over to patients as reduced quality of care and increased patient mortality (Aiken, Clarke, Sloane, Sochalski, & Silber, 2002; Blegen, Goode, & Reed, 1998; Kovner & Gergen Peter J., 1998; Needleman, Buerhaus, Mattke, Stewart, & Zelevinsky, 2002; Tourangeau, Giovannetti, Tu, & Wood, 2002). But what remains unclear is whether all nurses experienced the effects of hospital restructuring to the same degree, or whether nurses working for leaders with specific social competence experienced reduced effects.

Daniel Goleman has written extensively on emotional intelligence (1998a; 1998b; 1999; 2002), and recently asserted that while leadership includes analytic intelligence, task completion, and organizational skills, to be successful, its primary role must extend to understanding and effectively responding to both their own and other people's emotions (Goleman, Boyatzis, & McKee, 2002). Essentially, he claimed that the most effective leaders were those with high emotional intelligence (EI); namely those whose resonant leadership styles reflected the art of hearing their workers' negative feelings yet responding by positively impacting their mood and propelling them toward optimism and inspiration, even during times of difficulty. In times of change, and even chaos, when work is increasingly emotionally demanding, an effective leader needs to be more empathic and supportive, and demonstrate a wide range of EI competencies (Goleman et

al.). Empathy, or the ability to comprehend another's feelings and to re-experience them oneself, has been reported to be a central component of EI (Salovey & Mayer; 1990) and the key to successful resonant leadership (Goleman et al, 2002). Empathic leaders are attuned to a wide range of emotional signals, allowing them to sense the felt, but unspoken, emotions in another person or group (Goleman et al.; Schutte et al., 2001; Wolff, Pescosolido, & Druskat, 2002).

Our study sought to determine the extent to which resonant leadership styles, as perceived by nurses working for those nurse leaders, mitigated the detrimental effects of hospital restructuring.

Relevant Literature and Research

Leadership and Emotional Intelligence

Emotionally intelligent leaders inspire by engaging our emotions, passions and motivations to help us see the possibility of achieving goals that we might not otherwise see. They work through emotion to mobilize teams, coach performance, inspire motivation or create a vision for the future. Goleman's view of emotional intelligence is based on four domains (see Table 1), self-awareness, self-management,

[Insert Table 1]

social awareness and relationship management, each consisting of several competencies (Goleman et al., 2002). The competencies in the self-awareness and self-management domains reflect *personal competence* in understanding and managing one's own emotions. *Social competence*, or the ability to develop and manage relationships with others, is comprised of the domains of social awareness and relationship management. Most recently, Goleman has reframed these four EI domains to reflect leadership

competencies, using them to describe and distinguish six leadership styles. Four leadership styles (visionary, coaching, affiliative and democratic) are termed 'resonant styles' in that they demonstrate high levels of emotional intelligence, and two styles (pacesetting and commanding) are 'dissonant' in that they fail to demonstrate emotional intelligence. Resonance was chosen based on the *Oxford English Dictionary* reference to "the reinforcement or prolongation of sound by reflection" (Goleman et al.). Resonant leaders' messages are tuned to their own and others' feelings as they build resonance and positive working climates. Dissonance, an unpleasant, harsh sound in both musical and human terms, references a lack of harmony and being emotionally "out of touch" with employees. Dissonant leadership styles undermine the emotional foundations that support and promote staff success (Goleman et al).

In our study, we matched Goleman's EI competencies reported in Table 1 to his theoretical descriptions of the six leadership styles. Table 2 portrays the EI leadership

[Insert Table 2]

competencies which we viewed as being required to be present, or absent, for a nurse leader to display a specific leadership style. For example, Goleman had described visionary leaders as being able to move people toward shared dreams, having empathy for and developing relationships with others, sharing knowledge to empower others to innovate, having integrity (transparency), and continually reminding people of the greater purpose of their work (Goleman et al., 2002). We therefore required that these characteristics be present, before we classified a nurse as working for a visionary leader. Likewise, as pacesetting and commanding leaders are not known for having empathy for or developing others, these latter characteristics were required to be absent in defining

these dissonant leadership styles. Goleman's descriptions of the coaching, affiliative and democratic styles also informed the determination of their requisite characteristics. Coaching leaders focus primarily on developing others and achieving high levels of individual performance, affiliative leaders are strong relationship builders, and democratic leaders are consensus builders, promoting innovation, teamwork and collaboration.

Whether the most appropriate means of determining a leader's competence is through direct ability testing, through the leaders' self-assessment, or through the perceptions of those actually working for the leader, has received considerable discussion. Most researchers have concluded that having actual workers rate their leaders provides the best construct validity (Avolio & Bass, 1999; Bass & Avolio, 1991; Dasborough & Ashkanasy, 2002; Dunham, 2000; Kellett et al., 2002; Lord, Foti, & De Vader, 1984; Xin & Pelled, 2002), and we are following this tradition when we specify a leader's style on the basis of nurses' responses to survey questions reflecting the EI competencies required for that leadership style.

Moderating or Mitigating Effects of Leadership

While considerable literature supports the notion that emotional intelligence contributes to effective leadership (Dasborough & Ashkanasy, 2002; Freshman & Rubino, 2002; George, 2000; Goleman et al; McColl-Kennedy & Anderson, 2002; Pirola-Merlo, Haertel, Mann, & Hirst, 2002; Robbins, Bradley, Spicer, & Mecklenburg, 2001; Snow, 2001), the literature that has examined leadership as a moderator of effects has reported mixed results (Bliese, Halverson, & Schriesheim, 2002; de Vries, Roe, & Taillieu, 2002; Gavin & Hofmann, 2002; Pirola-Merlo et al., 2002; Villa, Howell,

Dorfman, & Daniel, 2003). For example, Pirola-Merlo et al. examined the role of transformational leadership in minimizing the impact of negative events on their teams, and found none to be significant, though they did find that leaders could minimize the impact of obstacles on team climate. Gavin and Hoffman used hierarchical linear modeling to investigate the moderating influence of leadership and found that supportive leaders partially buffered the negative effect of work-related hostility. We could not locate any research that examined the role and responsibility of leadership in mitigating (lessening in force or intensity) the effects of massive organizational change to employees. Even recent doctoral studies investigating emotional intelligence and leadership among nurses have not considered leadership as partially mitigating the effects of hospital restructuring on nurses (Graves, 2000; Molter, 2002; Tjiong, 2002; Vitello-Cicciu, 2002a; 2002b).

Thus, as extensive as the literature is, it does not address the ability of leadership styles to mitigate externally imposed pressures. A decade of restructuring and downsizing placed prolonged pressures on the nurses of Alberta and provided us with an opportunity to examine whether various styles of leadership differentially protected clinical nurses from the effects of the painful slash of the budget-cutting knife.

Methods

Survey and sample

The *Alberta Nurse Survey of Hospital Characteristics* (Giovannetti, Estabrooks, & Hesketh, 2002), a provincial component of the Canadian portion of the *International Survey of Hospital Staffing and Organization of Patient Outcomes* (Aiken et al., 2001) was used for this analysis. The survey was completed in 1998 and reports on various

organizational attributes (including the amount of local restructuring), and the state of Alberta nurses' physical and emotional well-being (Giovannetti et al.). Alberta had been the second Canadian province to undergo regionalization of its health authority structures in the mid 1990s, collapsing 283 hospital and health care boards into 17 regional health authorities. This, along with other initiatives in health care reform, led to the layoff of thousand of nurses in Alberta throughout the 1990s (Maurier & Northcott, 2000). The Alberta portion of the Canadian Nurse Survey was used because it was the only province that asked specific questions relating to local hospital restructuring, such as how many times each nurse had been laid off, and how many times each was required to change nursing units as a result of hospital restructuring.

The study sample was drawn from all registered nurses working in acute care hospitals in Alberta, Canada. Nurses were invited to participate through their professional regulatory body using annual mandatory reporting information. The final sample included 6526 nurses for a 53% response rate (Giovannetti et al., 2002).

Databases

We created seven databases from the single Alberta Nurse Survey so that each reflected a different leadership style, by choosing questions from the nurse survey that reflected 13 of Goleman's EI leadership competencies (see tables 1 & 2). We were limited to 13 leadership competencies by the survey, as very few survey questions had captured how leaders managed their own emotions (*personal competence)*. Goleman had argued that even the most successful leaders did not demonstrate all of his 19 EI competencies; a range of six to eight was most common (Goleman et al, 2002). Each of our resonant and dissonant leadership styles was defined by six to eight competencies, so

we felt that the available 13 competencies were adequate. We then determined the required *presence* (√) or *absence* (X) of each competency based on Goleman's description of each leadership style. Nurses had indicated the degree to which each particular statement described their current work environment using a Likert scale (from strongly agree to strongly disagree). By reporting on the presence or absence of a variety of work environment features, nurses had provided information that permitted the identification of the style of leader for which each of them worked. Therefore, *presence* of a competency in the nurse's leader was identified by the nurse's response of 'agree' or 'strongly agree' that the specific statement described their work environment; a nurse's response of 'disagree' or 'strongly disagree' was taken as *absence* of a leader's competency. A nurse was included as working for a specific style of leader (e.g. visionary) if that nurse reported both the presence of all the characteristics required by that style and the absence of all the characteristics contraindicating that style. Table 2 illustrates which specific leadership competencies had to be present or absent for a nurse was to be classified as working for a specific leadership style. "Leadership empathy", as indicated by the statement *administration that listens and responds to employee concerns*, was the competency that differentiated the dissonant and resonant groups – resonant leaders demonstrate empathy and dissonant leaders do not. A leadership competency that is not specifically required to be present or absent, is indicated by empty cells in Table 2, reflecting that this competency did not contribute to defining that specific leadership style.

The information on the supervisory environments was not complete enough to unambiguously classify the leadership environment of some nurses as working for only

one specific style of leader. However, consistent with Goleman's theorizations, leaders portray different resonant leadership styles depending on the situation at hand — visionary when inspiration is called for and democratic when consensus team building is needed. Therefore, if a nurse's response pattern was compatible with the characteristics of two different leadership styles, that nurse's data was included for analysis in both leadership styles. Such multiple classifications appeared only within the resonant leadership styles or within the dissonant styles, not between them (see Table 2). This is most fortunate since, as we will see, the major differences in outcomes appear between the resonant styles and the dissonant styles, and therefore cross-classifications within each group do not confound the important results. Differences in the means and standard deviations for each variable across all seven leadership styles confirmed that each database reflected a somewhat different population of nurses (see Table 3). The sample sizes for each of the six leadership styles ranged from 699 to 1065. Nurses who worked for leaders whose styles were anything other than the four resonant or two dissonant styles, were placed together in a seventh group of "mixed" or "unidentifiable" leadership styles. Initially 3868 cases, or over half of the entire Alberta

[Insert Table 3]

survey dataset, were classified into this group. In order to ensure that the statistics sensitive to sample size were at least relatively comparable, 1065 cases were randomly selected from the mixed leadership database for analysis.

Model Development

A theoretical model was developed which portrayed causal relationships between hospital restructuring (background causal variables) and effects on nurses (outcome

variables). The consistent significant results of a systematic review of the research literature on the effects of hospital restructuring that included layoffs on nurses who remained employed (Cummings & Estabrooks, 2003), informed the placement of the effects from the causal to the outcome variables. To keep the focus of this article clear and of reasonable length, we chose not to present the picture of the theoretical model underlying our research. Therefore, it should be noted that the final theoretical model also contained 63 causal relationships among the outcome variables. These were informed by the primary author's extensive review of the literature and participation in managing several episodes of hospital restructuring in a large tertiary care hospital.

Causal Variables (Hospital Restructuring)

The background causal variables included the number of restructuring events occurring in the hospital, being laid off in the past five years, changing units in the past five years, years worked in a hospital, part time/fulltime status, and age. Gender was included as a control variable. Summing positive responses to seven questions that asked whether specific events, such as loss of the senior nursing position without replacement, or an increase in the number of patients assigned to each nurse, had occurred in their hospital was used to derive the number of restructuring events experienced by each nurse. The number of times that each nurse was laid off or changed units was entered as reported, as was the number of years worked in that hospital and the nurse's age. Work status was coded as one for part-time and two for fulltime.

Nursing Outcome Variables

The nursing outcome variables included freedom to make important patient care decisions, emotional health, satisfaction with time to spend with patients, teamwork

between physicians and nurses, nursing workgroup collaboration, satisfaction with supervision, satisfaction with financial rewards, job mobility options, job security, and job satisfaction. The degree to which each feature was present in the nurse's workplace had been answered on a 4-point Likert scale. Intent to quit was measured on a 3-point scale. Nurses had recorded their degree of emotional exhaustion, psychosomatic symptoms and professional efficacy on 6-point scales from never (0) to every day (6). An important variable (unmet patient care needs), a proxy measure for quality of care (Sochalski, 2001; Aiken et al., 2001), was derived by summing the number of patient care tasks (maximum of 8) that were deemed necessary by the nurse but were left unattended by the end of the last worked shift.

Each latent concept in the model was indexed to a single indicator. Based on our judgement of how accurately the specific indicator reflected the corresponding underlying latent concept, an adjustment was made for the quality of each indicator by assigning 2 to 30 % of its variance as error (see Table 4). We were thus able to compensate for problematic wordings, lack of clarity in some questions, and other measurement concerns. Pairwise covariance matrices were created because listwise deletion would have resulted in the loss of too many cases.[2]

[Insert Table 4]

Model Estimation and Testing

The same model was estimated (using Lisrel 8.20 maximum likelihood estimation, Jöreskog & Sörbom, 1996) for each of the seven leadership styles/databases. The χ^2 for the seven models ranged from 205.208 (P = 0.00) to 340.258 (P = 0.00) and

the adjusted goodness of fit index (AGFI) ranged from 0.928 to 0.945, indicating substantial inconsistencies between the models and the data sets (Hayduk, 1987).

Model Modification

We carefully examined the seven models to locate model modifications that were theoretically tenable and that could be made uniformly across all seven leadership models. The following three criteria had to be met before any changes were made to the model. The change had to be theoretically reasonable. Second, the modification indices for the relevant coefficients had to be greater than seven in three or more models, or greater than ten in two or more models. Reciprocal effects that would have resulted in underidentified models were avoided.[3] Any modifications that were made were made to all the models, not merely those with the substantial modification indices. This consistency reduced the likelihood of capitalizing on chance sampling fluctuations that might have existed across the seven databases. That is, if we added an effect we added that effect to all the models, even if they did not demand it. If an effect truly was not required, it would merely lead to a null coefficient estimate and hence would not harm the model, but would cost a degree of freedom, thereby assisting to preserve a more justified model test. Seventeen additional coefficients were added to the model for estimation using these decision rules.

The large decrease in chi-square after these modifications (see Table 5) suggested a substantially improved, but not completely acceptable, model fit (Jöreskog & Sörbom, 1996; Hayduk, 1987). We could have made further unique modifications to

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[2] The covariance matrices for all seven leadership styles may be obtained from the primary author at gretac@ualberta.ca.

[3] Four coefficients in the original model that satisfied the first decision rules but that would have created loops were not acted upon.

[Insert Table 5]

each of the seven models to achieve model fit, but on balance it seemed better not to. The risk of biased estimates due to model misspecification had to be balanced against the risk of bias resulting from inserting 'effects' corresponding to chance sampling fluctuations in the covariances. The requirement of inserting changes consistent across all seven models had provided substantial protection against bias due to sampling-fluctuation induced controls during the numerous changes that had already been made, but the risk of improper-control biases increased markedly for changes unique to each model. Most of the models were only one or two modifications away from χ^2 fit but the likely small size of the estimates and the markedly increased risk of improper control bias led us to believe that the estimates in the slightly ill-fitting models were the best estimates we could attain and therefore we made no further model modifications.

The analysis occurred in two stages. Initially we analyzed the estimated coefficients for the effects of hospital restructuring on nursing outcomes for each leadership style (effects within leadership groups). We then analyzed the mitigation effect of leadership styles on the nursing outcome variables (effects between leadership groups).

Results

Effect of Hospital Restructuring on Nursing Outcomes

The direction and significance of fifty effects of hospital restructuring on nursing outcomes are reported in Table 6. Sixteen effects were significant, of which six

[Insert Table 6]

were significant in all seven leadership styles. The two largest and most significant effects were found in all seven leadership styles — the direct relationship between

hospital restructuring on unmet patient care needs, and the direct relationship between fulltime status and increased emotional exhaustion in nurses. Greater numbers of hospital restructuring events also led to more emotional exhaustion in nurses, deterioration in emotional health and disruption of nursing workgroup collaboration. Fulltime status led to more emotional exhaustion but also greater job satisfaction and satisfaction with the amount of time to spend with patients. The number of times that nurses changed units had no effect, and the number of times that nurses were laid off resulted only in a decreased perception of job security.

The direction and significance of sixty-three causal relationships among the outcome variables are reported in Table 7. Thirty-nine effects were significant, and of these, nine were significant in all leadership styles. Emotional exhaustion led to the greatest number of significant effects including more psychosomatic symptoms in nurses and unmet patient care needs, and deterioration in nurses' emotional health, satisfaction with financial rewards, and job satisfaction. Job security and satisfaction with supervision improved nurses' emotional health. Professional efficacy and freedom to make important patient care decisions led to fewer patient care needs being left unattended. The more patient care needs that were not met, the lower the nurses' satisfaction with the time to spend with patients, which further reduced nursing workgroup collaboration. Freedom to make important patient care decisions enhanced teamwork between physicians and nurses, leading to increased job satisfaction.

[Insert Table 7]

These within group results were not sufficiently different between leadership styles, nor did they show how leadership styles impact the effects of hospital

restructuring on nurses.

Impact of Leadership Styles

The analysis of leadership style impact required that we examine the degree to which nurses experienced the effects of hospital restructuring depending upon which style of leader they worked for. This analysis was enabled by graphing each leadership style's effect coefficient (hospital restructuring on nurses) with the means of the two variables contributing to that particular effect. Twenty-three graphs depicting the impact of leadership styles on selected significant and non-significant model effects are presented in Figures 1.[4] We discuss Figure 1a in some detail and then summarize the remainder.

[Insert Figures 1 and 2]

The slope of each line depicted in Figure 1a is the estimated effect coefficient of hospital restructuring events on unmet patient care needs for each specific leadership style. These show that hospital restructuring had approximately the same degree of effect on increasing unmet patient care needs for all nurses surveyed. However, the placement of each line is determined by the means of both variables (hospital restructuring and unmet patient care needs) for each specific leadership style and illustrates the degree to which the outcome variable (unmet patient care needs) differed by leadership style. Therefore, the differences between the seven lines are the impact of leadership styles on the relationship between hospital restructuring and unmet patient care needs. As the number of hospital restructuring events increased, so did the number of patient care needs that were left unattended at the end of the shift by all nurses. Yet, despite experiencing

[4] The graphs for all model effects by leadership style are available from the author at gretac@ualberta.ca.

relatively similar numbers of hospital restructuring events, the nurses who worked for leaders whom they perceived to be commanding or pacesetting, reported three times the number of unmet patient care needs than those who worked for resonant leaders (visionary, coaching, affiliative and democratic styles). This graph depicts the mitigation, or lessening in force or intensity, of the effect of hospital restructuring on unmet patient care needs by resonant leadership styles, and the intensification of these same effects by dissonant leaders, when compared with the mixed leadership styles. As just over half of the nurses surveyed were classified into the mixed leadership styles group (neither resonant nor dissonant), their leader's styles were the sample norm. When compared to this norm, resonant leaders mitigated this effect whereas dissonant leaders intensified it.

Although the effect of changing nursing units on the number of unmet patient care needs was not significant, the impact of leadership styles on these patient care needs was still evident (Figure 1b). The effect of hospital restructuring events on nurses' emotional exhaustion (Figure 1d), emotional health (Figure 1g), and work group collaboration (Figure 1j) were also mitigated by resonant leadership styles. While all nurses reported an increase in emotional exhaustion resulting from hospital restructuring events, those who worked for dissonant leaders experienced these effects weekly, whereas nurses working for resonant leaders consistently reported that they experienced emotional exhaustion on a monthly basis. The emotional health of nurses was markedly different between dissonant and resonant leadership groups. Nurses working for resonant leaders reported improved emotional health over the previous year compared to the deteriorating emotional health reported by nurses who worked for dissonant leaders. The effect of fulltime status on nurses' emotional exhaustion (Figure 1e) was also mitigated by

resonant leaders as was the effect of nurses' age on their reported psychosomatic symptoms (Figure 1f) and the effect of changing units on job satisfaction (Figure 1l).

Effects of hospital restructuring for which leadership style had no impact included the number of years that nurses worked in their current hospital on both job security (Figure 1h) and intent to quit (Figure 1k), and the number of times that a nurse was laid off on job security (Figure 1i). These graphs depict no difference in results between the leadership styles.

Some causal relationships among the nursing outcome variables were also mitigated by resonant leadership styles. Figure 2a illustrates the negative effect of unmet patient care needs on the nurses' satisfaction with time to spend with patients. However, the mitigation effect was not as large as some of the previous examples because the slopes of the effects were greater, and thereby were close to merging. This merging was even more evident in Figure 2b where the effect of nurses' emotional exhaustion on their psychosomatic symptoms was highly significant, yet because the lines were merged between leadership styles, it was clear this effect was significantly large irrespective of leadership styles. The effects that were more clearly mitigated by resonant leadership styles were nurses' job satisfaction on their reported psychosomatic symptoms (Figure 2c), satisfaction with time to spend with patients on nursing work group collaboration (Figure 2f), and the effects of nurses' emotional exhaustion, emotional health and teamwork with physicians on their job satisfaction (Figures 2i, 2j, 2k respectively).

Discussion

In this study, we did not examine all aspects of leadership or administrative competence, which would have included at minimum task completion, organizational

skills, and analytical intelligence. We focused on leadership that was reflected through emotional intelligence. Although our findings are rich in a variety of avenues, we believe that it is of particular importance to highlight three aspects of our work. We focus on (a) leader/staff relationships, (b) implications for organizational policy, and (c) study limitations that should guide further research.

Leader/staff relationships

The results of our theoretical model estimation showed that all nurses felt the effects of hospital restructuring; however nurses who worked for resonant leaders experienced fewer negative effects, leaving them with greater satisfaction and more of what might be termed "emotional resilience" with which to provide quality care. This was evidenced by fewer necessary patient care needs being left unattended. Our findings suggest that resonant leaders used their emotional skills to understand what individual employees or teams were feeling during difficult times, thereby building trust through listening, empathy, and responding to staff concerns. After layoffs, resonant leaders would have been expected to work with remaining staff to understand their issues, their increased workload and emotional turmoil resulting from the lay off of colleagues and changes in practice patterns (Bridges, 1991). After hospital restructuring, these resonant leaders would also have continued to invest in staff development and to consider nurses' freedom to make important patient care decisions a high priority.

Leaders portraying dissonant styles would not have been tuned to their staff's emotional needs nor have focused on developing or maintaining relationships with them. The behaviours of leaders in the group exhibiting mixed leadership styles may have been perceived as being somewhere between the resonant and dissonant leadership styles on a

regular basis. These leaders may also have demonstrated a resonant style in one situation and a dissonant style in another. The large standard deviations in the means of the mixed leadership style group (Table 3) suggest that the latter was the case, and at minimum that the EI behaviours of this undifferentiated group of leaders were diverse. The intense organizational and programmatic demands that hospital restructuring placed on its leaders may also have led to more nursing leaders being categorized into either the mixed or dissonant group. Their attention was focused on organizational or regional demands rather than those of the front line nurses. Our findings suggest that it is important that these nursing leaders be given any necessary developmental training that will lead to increased *emotional intelligence,* as well as, the opportunity to focus on front line staff during and following hospital restructuring. This would facilitate these nursing leaders enhancing and using their emotional intelligence skills to positively affect nurses.

A commitment to resonant leadership is an important expectation for hospital chief executive officers and senior administration to hold for their front-line managers. This includes expecting that nursing leaders will understand the importance of developing collaborative and supportive relationships with front line staff, and acting appropriately on that understanding. It also implies that these same nursing leaders will spend this time developing and maintaining relational capital among staff, communicating how the work of the staff contributes to the organization's vision, and working with providers including nurses to optimize performance and capacity to make patient care and workplace decisions. Our findings suggest that leadership styles reflecting a resonant profile would result in better quality of care by front line providers. Hiring resonant leaders or providing training for existing leaders hence becomes a

priority consideration for chief executives and nursing administrators. Without resonant nursing leaders who listen and respond to staff, manage conflict, build relationships with staff and invest in their development, practice environments are not optimized and in worst cases can become emotionally noxious. Our findings suggest that resonant leadership styles enhance teamwork between physicians and nurses, nursing workgroup collaboration, and the freedom to make important patient care decisions – all of which are important aspects of nursing practice environments (Aiken & Patrician, 2000; Estabrooks et al., 2002). Health Canada (2000) has advocated that healthcare organizations reduce their occupational health and financial risk by establishing an organizational climate of fairness, purpose and trust, in which staff wellness is a priority, leading to greater staff satisfaction. Our findings suggest that resonant nursing leadership is a key – but missing – ingredient in their model for achieving these goals in hospitals.

Researchers and developers of EI training programs have identified that it is possible to learn how to increase emotional intelligence. Studies have shown that by wanting to learn and choosing to make a sustained, intentional behavioural change, people can change their performance on a complex set of competencies that distinguish outstanding managers (Boyatzis, 2001). MBA students with specific EI training showed a 28% improvement in personal competence and 56% improvement in social competence by the end of their MBA program and years later, these improvements remained (Boyatzis, 2001). The Consortium for Research on EI has summarized empirical findings on the best mode of learning EI competencies and has guidelines for developing training programs (Goleman, 2002). The incorporation of EI training into the basic nursing curriculum has also been identified as essential for nursing education (Evans & Allen,

2002).

Our findings suggest that when recruiting nursing leaders, candidates with emotional intelligence would help to build leadership teams that have staff health and well being as a priority. EI competencies can be incorporated into hiring requirements beyond leadership positions as well, including any front-line staff who have interaction with patients. The need for schools of nursing to recruit and select future students with EI competencies has already been identified (Brewer & Cadman, 2000).

Our findings must not be taken to imply that by hiring resonant leaders, hospitals can mitigate – and thereby justify – the adverse effects of restructuring. Resonant leadership styles in this study did not eliminate the negative effects of hospital restructuring on nurses; they did lessen some of the negative effects that resulted and did so to a greater extent than dissonant or mixed groups of leaders. We assume that hospital restructuring will continue in one form or another as long as hospital boards and governments face fiscal challenges and health reform initiatives. However, processes that consider the impact to employees and patients, that build in time for resonant leaders to spend with their staff, and that are founded on leaders having supportive and collaborative relationships with their staff, may reduce some of the detrimental effects of hospital restructuring shown in our findings.

Study Limitations

Our results should be considered in light of the greatest challenge that faced us – measuring the emotional intelligence competence of the nurses' leaders by using answers that nurses gave to a cross-sectional survey describing characteristics of their current job. We examined the translation validity (Trochim, 2003) of our process to operationalize

Goleman's descriptions of his six leadership styles into our research. Many of the thirteen questions that we used referred to specific behaviours of the nurse's supervisor or manager, adding to construct validity. Other questions were chosen based on the first author's judgement and in collaboration with an external researcher (who focuses on clinical outcome and health system research), as well as the third author. The first and third authors have between them over 28 years of administrative experience in acute care hospitals in four provincial jurisdictions. To ensure that each question appropriately reflected a specific EI competency, only questions that described a specific characteristic that is a front line leader's responsibility and that could be perceived by a staff nurse as an EI competence described by Goleman, were selected. Concurrent validity (Trochim, 2003) of the three theoretical groupings of leadership styles (resonant, mixed and dissonant) was supported by using the required presence or absence of thirteen EI leadership competencies to sort cases into one of the three mutually exclusive groups. The significant difference in study results for each of the three groupings of leadership styles suggests that we had achieved discrimination between these three groupings.

Future research into the mitigation by leaders of the effects of adverse events on followers should be done prospectively, and by using an instrument designed to measure both the EI of leaders as perceived by followers and EI more directly. Since the responsibility for most aspects of the nursing unit environment fall within the bounds of the front line nurse manager, our findings primarily reflect that position. This also raises questions into the influence of the senior nursing leader's style or that of leadership teams on front-line nursing managers and nurses. Denis, Lamothe and Langley (2001) have examined the notion of collective leadership during major organizational change. This

concept as fulfilled by a team of nursing leaders would be an additional area for future research.

Conclusion

We developed and tested a theoretical model of causal relationships between hospital restructuring events that had led to the layoff of thousands of nurses and effects on nurses' work and health. Our findings indicated numerous detrimental effects to nurses' health and ability to provide quality care to patients, as a result of widespread changes to hospitals. We also found that of the nurses who experienced negative effects from restructuring, those who worked for resonant leaders experienced these effects to a much lesser degree than those who worked for dissonant leaders. Resonant leadership styles mitigated most of the effects of hospital restructuring on their nurses, while dissonant leaders intensified these same effects. Our findings suggest that by investing energy into relationships with their nurses, resonant nursing leaders not only positively affect the health and well being of their nurses, but also ultimately, the outcomes for patients.

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Table 1.

*Emotional Intelligence Domains and Associated Competencies**

Personal Competence: These capabilities determine how we manage ourselves

Self Management

- Emotional self-control
- Transparency
- Adaptability
- Achievement
- Initiative
- Optimism

Self Awareness

- Emotional self-awareness
- Accurate self-assessment
- Self-confidence

Social Competence: These capabilities determine how we manage relationships

Relationship Management

- Inspirational leadership
- Influence
- Developing others
- Change catalyst
- Conflict management
- Building bonds
- Teamwork and collaboration

Social Awareness

- Empathy
- Organizational awareness
- Service

*Goleman, D. (2002). *The New Leaders: Transforming the art of leadership into the science of results*. London: Little, Brown, p. 39.

Table 2.

Interpreting Goleman's leadership styles

		Resonant	Styles			Mixed	Dissonant	Styles
Competency	**Survey Question**	**Visionary**	**Coaching**	**Affiliative**	**Democratic**		**Pacesetting**	**Commanding**
Empathy	Administration that listens and responds to employee concerns	√	√	√	√		X	X
Conflict management	A manager or supervisor who backs up the nursing staff in decision-making, even if the conflict is with a physician			√				X
Participatory	Nurse managers or clinical supervisors consult with staff on daily problems and procedures			√	√		X	
Developing others	Active staff development or continuing education programs for nurses		√				X	X
Achievement focused	High standards of nursing care are expected by the administration.	√	√				√	
Power & influence sharing	Opportunity for staff nurses to participate in policy decision				√		X	X
Innovation	Support for new and innovative ideas	√					X	

Table 2 (continued)

Interpreting Goleman's leadership styles

		Resonant Styles				Mixed	Dissonant Styles	
Competency	**Survey Question**	**Visionary**	**Coaching**	**Affiliative**	**Democratic**		**Pacesetting**	**Commanding**
Empowering	Freedom to make important patient care and work decisions	√	√		√			X
Visionary – inspiring	A clear philosophy of nursing that pervades the patient care environment	√						
Integrity	Not being placed in a position of having to do things that are against my nursing judgment.	√						
Relationship focused	A senior nursing administrator who is highly visible and accessible to staff	√	√	√				X
Teamwork/ Collaboration	Staff nurses have the opportunity to serve on hospital and nursing committee	√		√	√			
Recognition	Praise and recognition for a job well done			√				X
Cases (n)		699	851	716	1065	1065	674	799

To be classified as working for a specific leadership style, a nurse had to have agreed or strongly agreed with all the survey questions marked as "√" and to have disagreed or strongly disagreed with all the survey questions marked "X" in the applicable column. An empty cell means this leadership competency was not relevant to classifying the leadership style heading the column.

Table 3.

*Means and standard deviations of variables used to distinguish seven leadership styles**

Leadership Competency	Visionary	Coaching	Affiliative	Democratic	Mixed	Pacesetting	Commanding
	Mean /SD	Mean /SD	Mean /SD	Mean /SD	Mean /SD	Mean /SD	Mean /SD
Empathy	3.24 .429	3.22 .414	3.25 .435	3.19 .394	2.12 .728	1.53 .500	1.43 .495
Conflict management	3.47 .587	3.39 .650	3.55 .498	3.42 .622	2.73 .892	1.89 .869	1.44 .497
Participatory	3.29 .662	3.22 .693	3.44 .497	3.40 .489	2.60 .835	1.58 .494	1.75 .766
Developing others	3.09 .757	3.35 .476	3.10 .754	3.02 .792	2.39 .880	1.47 .499	1.83 .838
Achievement focused	3.72 .450	3.67 .471	3.68 .477	3.64 .504	3.27 .723	3.41 .492	2.94 .945
Power & influence sharing	2.97 .622	2.89 .661	2.91 .666	3.15 .362	2.18 .784	1.40 .491	1.40 .491
Innovation	3.38 .451	3.13 .603	3.18 .602	3.17 .561	2.53 .707	1.62 .485	1.69 .654
Empowering	3.31 .464	3.28 .449	3.25 .539	3.28 .449	2.71 .667	2.16 .758	1.71 .453
Visionary – inspiring	3.32 .468	3.16 .614	3.17 .613	3.17 .584	2.59 .710	2.18 .746	2.02 .762
Integrity	3.41 .492	3.23 .649	3.27 .657	3.23 .630	2.81 .732	2.51 .782	2.32 .777
Relationship focused	3.35 .479	3.37 .484	3.39 .487	2.79 .898	1.92 .852	1.53 .721	1.31 .462
Teamwork/ Collaboration	3.48 .500	3.37 .616	3.44 .497	3.47 .500	2.93 .693	2.58 .734	2.54 .740
Recognition	3.07 .712	3.00 .747	3.30 .460	2.96 .757	2.14 .837	1.52 .677	1.32 .468

* All variables were recoded to ensure that the highest value reported more or a greater intensity of the term used to define and label the variable. All means were calculated on the recoded 4-point Likert scale. 1= Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree.

Table 4.

Measurement error specification for latent variables in the structural equation model

Variable	% assessed as measurement error	Variance from the covariance matrix (Visionary style)*	Measurement error for variable (Visionary style)
Unmet patient care needs	25	4.047	1.0117
Freedom to make important patient care decisions	10	0.205	0.0205
Professional efficacy	30	1.592	0.4776
Satisfaction with time to spend with patients	10	0.642	0.0642
Emotional Exhaustion	15	2.626	0.3939
Psychosomatic symptoms	30	2.981	0.8943
Emotional health	5	0.704	0.0352
Teamwork between physicians and nurses	10	0.698	0.0698
Nursing workgroup collaboration	25	0.549	0.1372
Job Security	10	0.565	0.0565
Satisfaction with supervision	10	0.688	0.0688
Satisfaction with financial rewards	5	0.804	0.0402
Job mobility options	20	0.741	0.1482
Job satisfaction	5	0.788	0.0394
Intent to quit	10	0.453	0.0453
Hospital restructuring events	25	2.104	0.5260
Times nurse changed units	5	2.255	0.1127
Part time / fulltime status	10	0.241	0.0241
Years of experience in current hospital	5	49.023	2.4115
Times nurse laid off	5	0.741	0.0370
Age	5	72.378	3.6189
Gender	2	0.027	0.0005

*The same procedure for calculating measurement error was completed for each of the leadership styles. The measurement error is the product of the assessed percentage and the variance of the variable obtained from the covariance matrix of each specific database.

Table 5.

Fit of the initial and final models

	Visionary	Coaching	Affiliative	Democratic	Mixed	Pacesetting	Commanding
Theoretical Model							
Chi-square	232.954	259.840	205.208	295.731	340.258	253.020	273.417
Significance	P = 0.000	P = 0.000	P = 0.000	P = 0.000	P = 0.000	P = 0.000	P = 0.000
Degrees of freedom	113	113	113	113	113	113	113
AGFI	0.934	0.939	0.945	0.945	0.937	0.928	0.933
Following 17 modifications							
Chi-square	129.717	138.804	122.625	155.885	205.642	147.318	175.487
Significance	P =. 012	P = .002	P = .034	P =. 000	P = 0.000	P =. 000	P = 0.000
Degrees of freedom	96	96	96	96	96	96	96
AGFI	0.957	0.962	0.966	0.966	0.955	0.949	0.949
N	699	851	716	1065	1065	674	799

Table 6.

Significant and non-significant effects of hospital restructuring variables on nursing outcomes

	Causal Variable						
Nursing Outcome Variables	Hospital restructuring events	Times nurse changed units	Part time / fulltime status	Years of experience in current hospital	Times nurse laid off	Age	Gender
1 Unmet patient care needs	+*	ns	ns			–	
2 Freedom to make important patient care decisions	ns		ns*		ns*	+/–	
3 Professional efficacy	ns*	ns*	ns*				
4 Satisfaction with time to spend with patients		ns*	+/–				
5 Emotional Exhaustion	+	ns	+*	ns			
6 Psychosomatic symptoms	ns	ns*		ns*	ns*	–*	
7 Emotional health	–						
8 Teamwork between physicians and nurses	ns*	ns			ns*		
9 Nursing workgroup collaboration	–	ns*		ns*	ns	ns*	
10 Job Security	ns		ns*	+*	–*	–	
11 Satisfaction with supervision					ns*		
12 Satisfaction with financial rewards				ns*		ns	
13 Job mobility options				–		–	
14 Job satisfaction	ns*	ns*	+/–	ns*	ns*		
15 Intent to quit	ns*	ns	ns*	–*			

(+) - A significant positive effect was estimated in at least 2 of 3 leadership style groups (resonant, dissonant and mixed).
(–) - A significant negative effect was estimated in at least 2 of 3 leadership style groups (resonant, dissonant and mixed).
ns - Estimated effect was not significant in all, or at least most of the leadership styles
* - Effect was consistent across all 7 leadership styles.
Blank - Effect was not estimated.

Table 7.

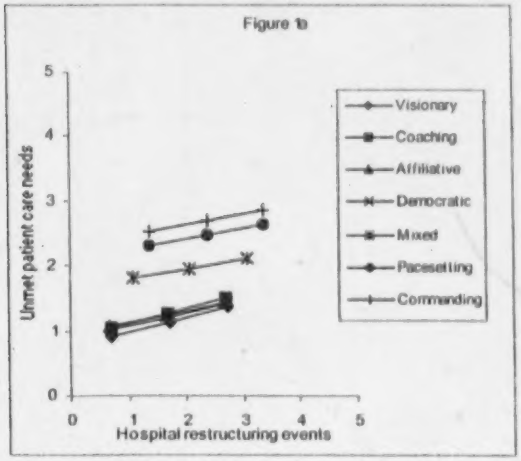
Significant and non-significant relationships among nursing outcome variables

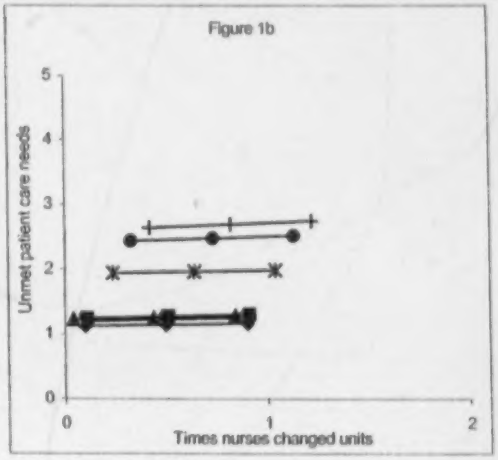
	Nursing Outcome Variables														
Nursing Outcome Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 Unmet patient care needs		–	–		+	+						ns*			
2 Freedom to make important patient care decisions						ns*	+								
3 Professional efficacy		ns*		ns*	ns*	ns*	ns								
4 Satisfaction with time to spend with patients	–*	+													
5 Emotional Exhaustion		ns		ns					–		–				
6 Psychosomatic symptoms					+*		+							–	
7 Emotional health				+	–*					+	+				
8 Teamwork between physicians and nurses		+*		+			ns								
9 Nursing workgroup collaboration	–	+		+*		ns*									
10 Job Security					–										
11 Satisfaction with supervision		+		+					+						
12 Satisfaction with financial rewards		ns		ns	–*			ns	ns						
13 Job mobility options						–				+*				+	
14 Job satisfaction	ns*	ns	+	+	–*		+*	+	ns		ns	+			
15 Intent to quit	ns*	ns	ns			+				–	ns*	ns*	+	–	

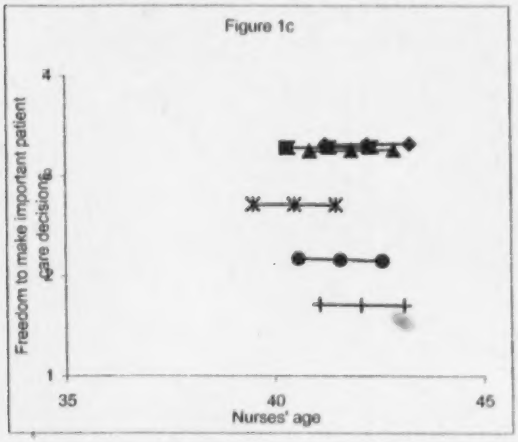
(+) - A significant positive effect was estimated in at least 2 of 3 leadership style groups (resonant, dissonant and mixed).
(–) - A significant negative effect was estimated in at least 2 of 3 leadership style groups (resonant, dissonant and mixed).
ns - Estimated effect was not significant in all, or at least most of the leadership styles
* - Effect was consistent across all 7 leadership styles.
Blank - Effect was not estimated.

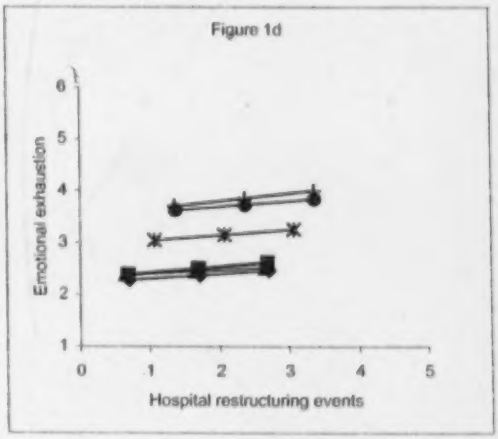
Figure 1

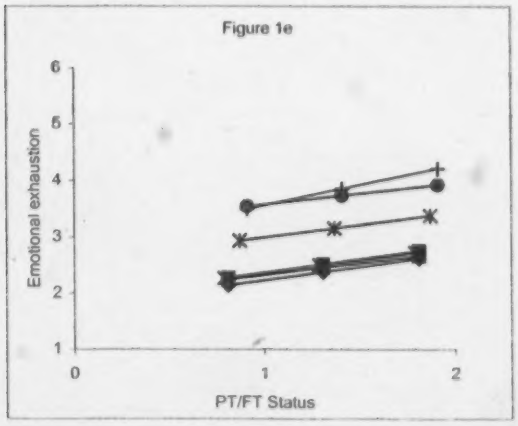
Selected examples of the impact of leadership styles to mitigate or intensify the effects of hospital restructuring on nurses











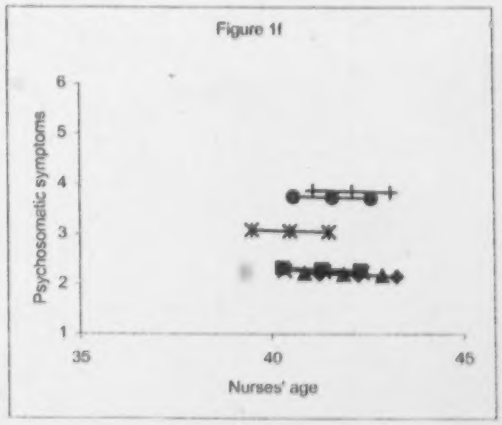
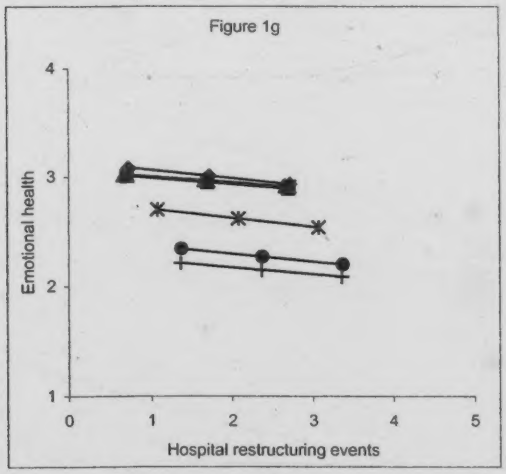
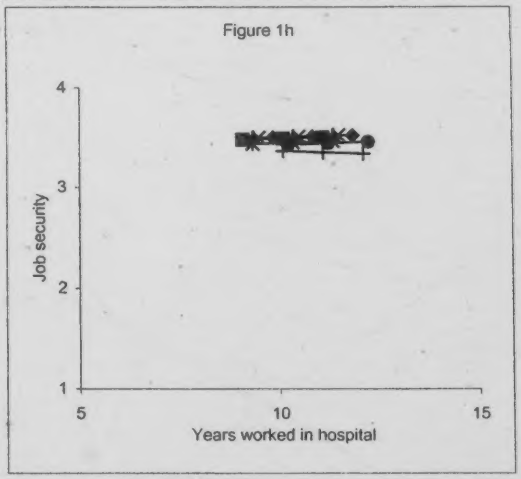
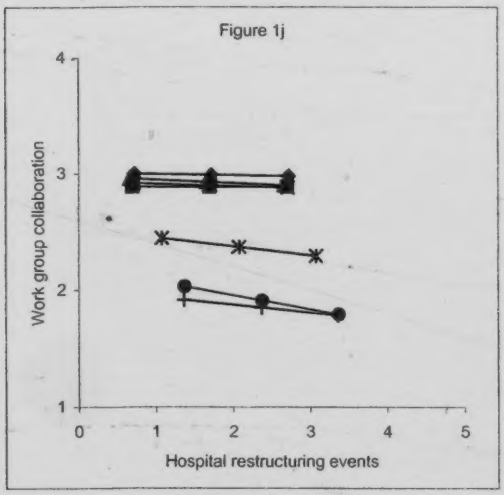


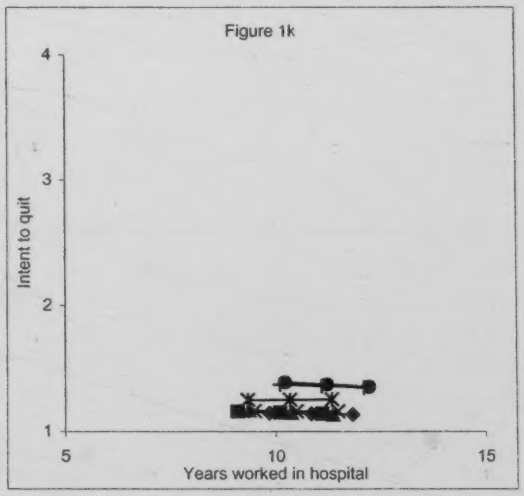
Figure 1 cont'd

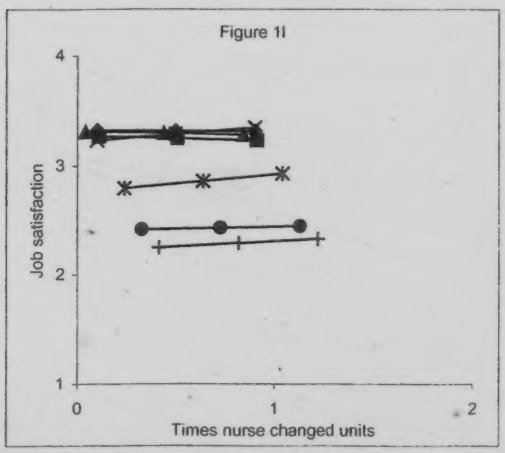
Selected examples of the impact of leadership styles to mitigate or intensify the effects of hospital restructuring on nurses











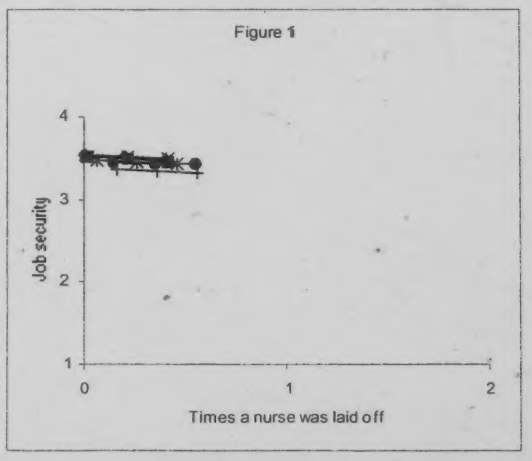


Figure 2

Selected examples of the impact of leadership styles to mitigate relationships among the nursing outcome variables

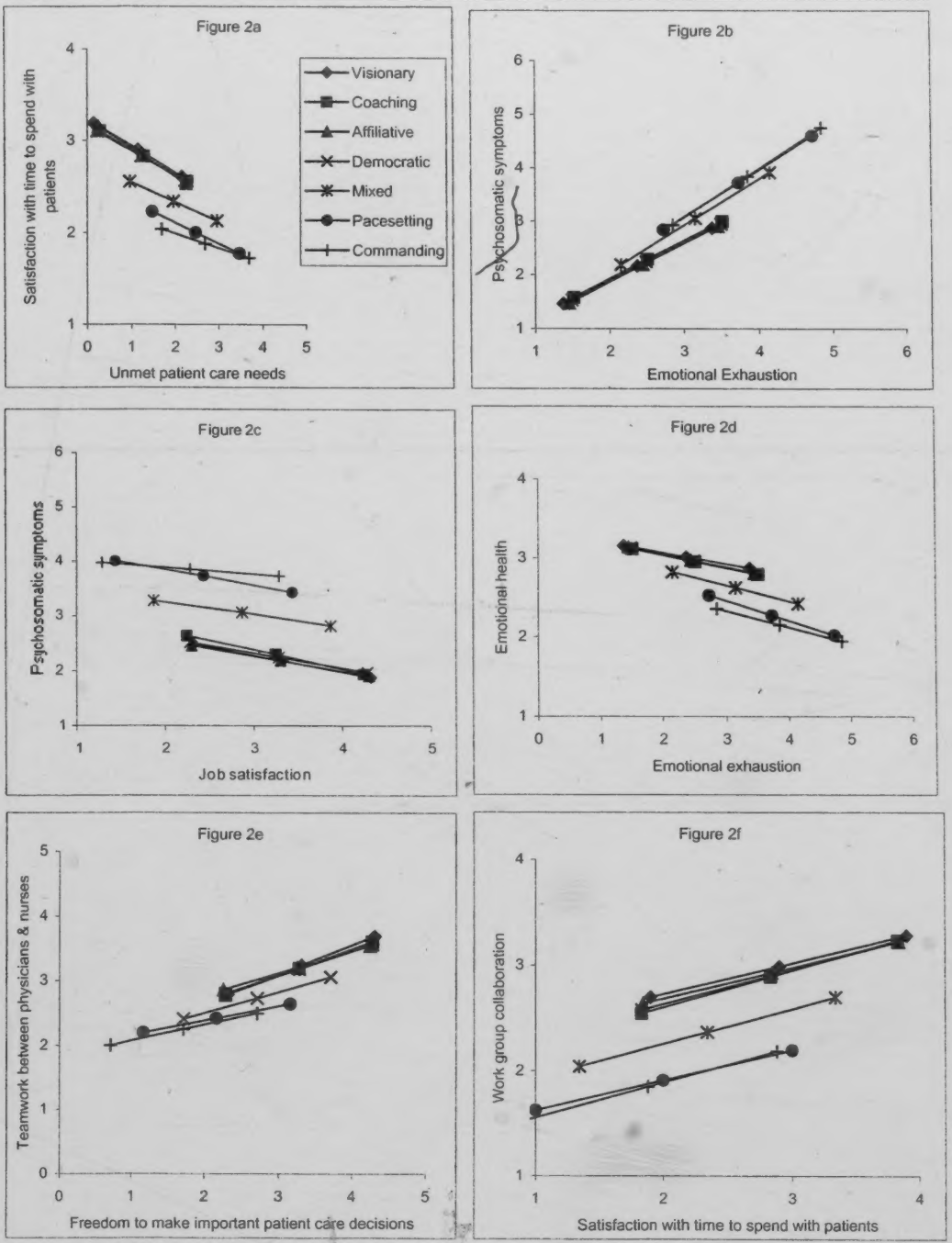
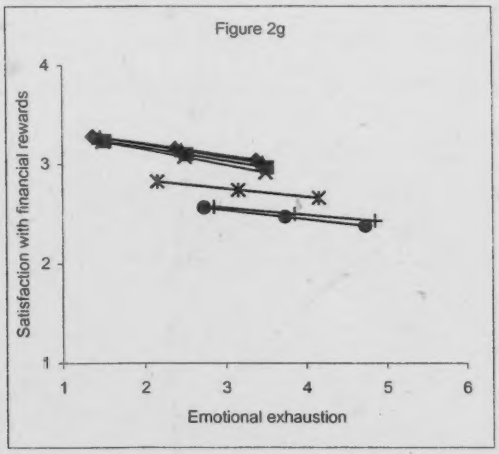
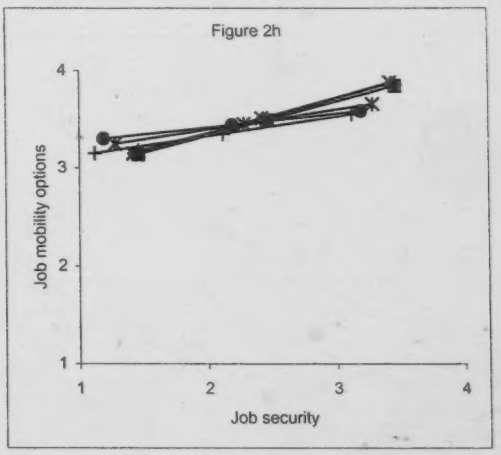
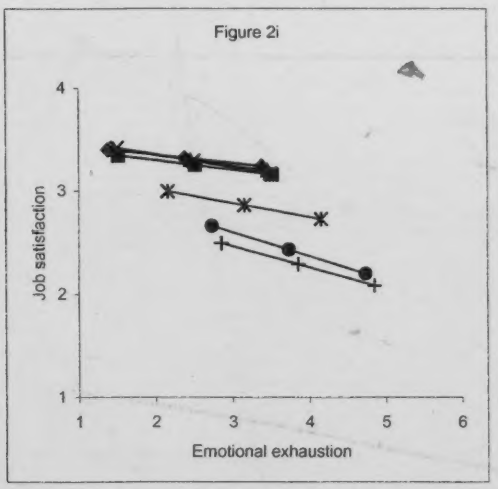


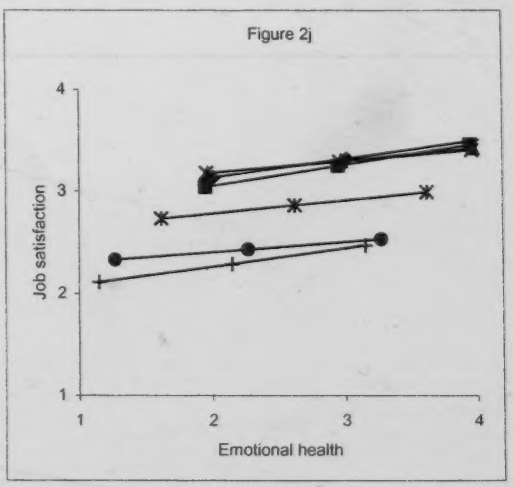
Figure 2 cont'd

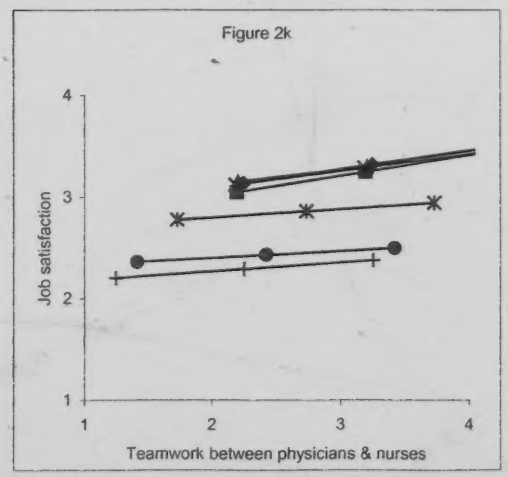
Selected examples of the impact of leadership styles to mitigate relationships among the nursing outcome variables











Running head: RELATIONAL ENERGY AS ADJUVANT

Paper #4 - Relational energy as adjuvant: Toward a theory of how resonant leaders mitigate the negative nursing outcomes of adverse events

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Keywords: adjuvant, leadership, hospital restructuring, relational energy, mitigation, theory.

Relational energy as adjuvant: Toward a theory of how resonant leaders mitigate the negative nursing outcomes of adverse events

My doctoral research, in which I examined the effects of hospital restructuring on nurses, showed that many of the negative effects of hospital restructuring on nurses were mitigated or intensified by the styles of their nursing leaders. What is unclear is the mechanism through which this mitigation occurs. The purpose of this paper is to explore one potential explanation for why the mitigation process by resonant nursing leaders occurs. This explanation represents a beginning theory that I am developing – a theory of how resonant leaders mitigate the negative nursing outcomes of adverse events. In this paper, I present my premise, a review of hospital restructuring effects, a discussion of two types of findings of my earlier research that show the mitigation of effects by resonant leaders, a discussion of adjuvant action and the application of this action to my findings followed by considerations for future research. This exploration is prefatory to the development of an original theory and so only an abbreviated discussion of the literature is included under future research.

The Premise

I propose that the degree to which nurses experience the effects of hospital restructuring is explained by the presence or absence of active, dynamic and supportive interactions based on the relational energy invested by the resonant leader into building and maintaining relationships with the nurse. The degree of mitigation is directly related to the degree to which these interactions are present in a nurse's work life. These interactions enhance the nurse's ability to cope with workplace stress resulting from

hospital restructuring leading to fewer reported negative effects. The resonant leader's investment of relational energy that stimulates the nurse's coping response is likened to the action of an adjuvant that enhances the human immune system response to an antigen. In this paper, I define adjuvant as the relational energy between the resonant leader and nurse that stimulates a coping response in the nurse to an adverse event.

Effects of Hospital Restructuring

My research showed that hospital restructuring negatively affected nurse's health and well being when that restructuring was repeated and included the layoff of healthcare staff (Cummings & Estabrooks, 2003). I will briefly review why hospital restructuring had such an impact on nurses and their workplaces. Hospital restructuring in the 1990s occurred in several different forms, from introducing changes to nurse staffing patterns on individual units to the closure of full hospitals. I propose that restructuring that *included widespread layoffs* characterized the most destabilizing environment for nurses both professionally and personally because it threatened their professional identity, the opportunity to work in their chosen career, and the ability to earn an income necessary to achieve personal goals. The meanings that nurses attributed to each of these and the opportunity to contribute to society and their families were altered significantly when either they or their colleagues were laid off from work that they believed would be life-long and secure.

Hospital restructuring also disrupted most of the patient care processes that occurred at all levels of the organization. At the regional level, the governance of multiple hospital by a single regional health authority changed the identity of each individual hospital as well as the relationships among employees within them. Employees

of specialty programs may have initially been competitors for funding and status, yet were now expected to act as partners within the same region. Policies and procedures that once supported local needs were now changed to reflect regional requirements. At the unit level, the nurse/patient relationship was affected when the nurse's access to resources and a supportive infrastructure to fulfill the job were eliminated, radically altered or constantly in flux. This infrastructure included sufficient supplies, continuing education, opportunities to collaborate with other nursing and medical colleagues, and sufficient time to spend with patients.

I argue that it was not the structural changes alone that had this negative impact on nurses but that it was also the manner in which the changes occurred. The lack of inclusion of front-line staff, the rapid "overnight" pace of widespread changes and the disruption of nearly every conceivable team and process altered many of the meanings that nurses held about their work. Nurses had held a coherence of meanings, both individually and collectively, related to their relationships with employers, colleagues and patients and to how they expected to fulfill their responsibilities. This coherence of meanings was now seriously disrupted. Workplace stress, resulting from the disruption to this coherence, would have manifested itself in the form of emotional exhaustion, fatigue and other health effects (Health Canada, 2000). When loss is perceived or real, it leads to stress that can harm health and well being, and lead to workplace injuries, worker illness, inefficiency and a loss of self-efficacy (Health Canada). This loss of the sense that nurses can influence the course of events in their normal daily life can add a threat of personal non-confidence to the external threats from restructuring, further perpetuating a negative impact to patient care.

My research has confirmed that nurses' emotional exhaustion and fatigue increased significantly after hospital restructuring while their job satisfaction and emotional health and well being decreased (Cummings & Estabrooks, 2003). However, the degree to which nurses experienced these effects varied depending on what style of nursing leader they worked for (Cummings, Hayduk & Estabrooks, in review). Using Goleman, Boyatzis, and McKee's (2002) descriptions of leadership styles founded on emotional intelligence, I described three groupings of leadership styles – resonant (visionary, coaching, affiliative and democratic), dissonant (pacesetting and commanding), and mixed. This latter group were neither consistently resonant nor dissonant, but somewhere in between. Nurses who worked for leaders who were deemed to portray resonant styles reported the lowest mean scores in the negative effects to nurses' health following hospital restructuring. Nurses who worked for leaders whose styles were portrayed as pacesetting or commanding reported the highest scores on these same negative effects following hospital restructuring. Nurses who worked for leaders whose styles were mixed reported scores between those of the resonant and dissonant groups.

Two types of study findings that depict mitigation of effects by resonant leaders

The first example of my research findings that depicts mitigation of the negative effects of hospital restructuring events (X-axis) on nurses' emotional exhaustion (Y-axis) by resonant nursing leaders is shown in Figure 1. The slopes of the lines indicate the direct effect of hospital restructuring events on nurses' emotional exhaustion. The parallel slopes of these effects for all leadership styles show that hospital restructuring was felt

relatively equally by all nurses. However, nurses who worked for dissonant leaders reported that they were emotional exhausted on a weekly basis, while those who

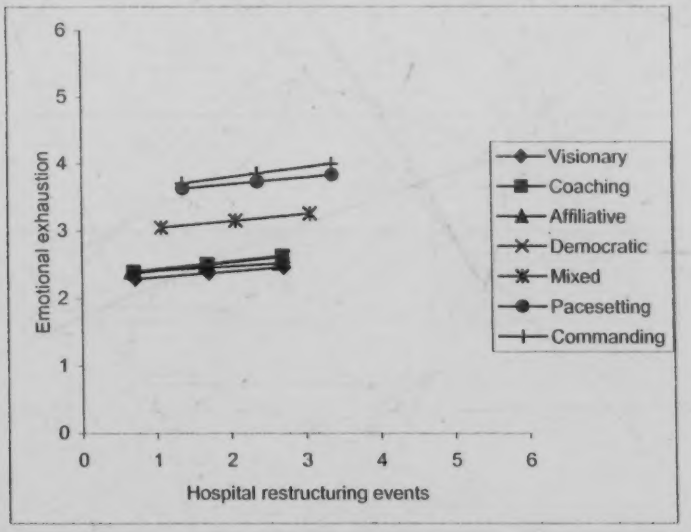

Figure 1. An example of the typical impact of resonant leadership styles to mitigate the effects of hospital restructuring on nurses

worked for resonant leaders reported feeling emotionally exhausted on a monthly basis. This type of effect, in which there were parallel slopes across all leadership styles, was typical of most study findings. What is it that separates the slopes of the lines between the resonant, mixed and dissonant groups? I had interpreted the answers that nurses provided to thirteen questions to be the nurse's perspective of their leader's emotional intelligence competencies. These responses were then used to assign that nurse's response data into one or more of seven databases. Each database depicted a different leadership style. The emotional intelligence competencies present in resonant leaders suggest that they value nurses' contributions to patient care and policy decision making, and that they hold supportive and collaborative relationships with nurses as a high priority.

Recalling that one foundation in my premise is that the emotional intelligence of the resonant leader triggers the relational energy between the resonant leader and the nurse and continuing this argument, I now review another example from my earlier research findings. This example is one in which the slope of the effects were not the same for all nurses across the seven leadership styles (see Figure 2a), due to the interaction of a third concept, that of relational energy. To interpret Figure 2a, we can see that when nurses' emotional exhaustion was generally low[5] (working for any style

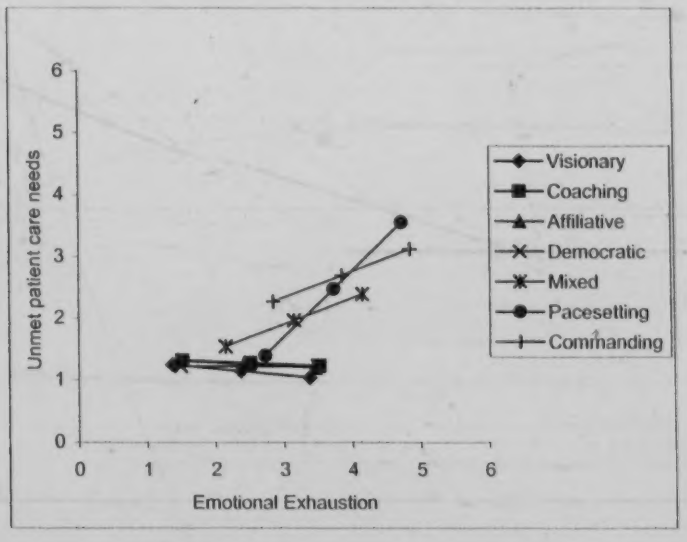

Figure 2a. The impact of nurses' emotional exhaustion on the number of patient care needs left unattended by leadership style.

of leader), they were able to attend to the majority of patient care needs. However, when nurses who worked for dissonant (pacesetting and commanding) and mixed leaders experienced hospital restructuring, they reported greater frequency of emotional exhaustion that led to significantly higher numbers of patient care needs being left unattended. Nurses who worked for resonant leaders were actually able to attend to more

[5] A lower score on the emotional exhaustion scale reflects less emotional exhaustion

patient care needs despite being very emotionally exhausted. I argue that this is because of the resonant leader's attention to the emotional needs of their nurses related to their work stress. Dissonant leaders' inattention to these same needs resulted in the nurses' emotional exhaustion interfering with their ability to provide quality care. Therefore the effect that nurses' emotional exhaustion had on the number of patient care needs left unattended varied significantly from one leadership style to another. I propose that this is due to an interaction effect with a third concept. I believe that this third concept can be interpreted as relational energy.

In order to show this, I have converted Figure 2a from a two-dimensional graph to a three-dimensional cube (Figure 2b). The nurse's emotional exhaustion continues on the X-axis, with the number of unmet care needs on the Y-axis. The Z-axis shows the individual leadership styles collapsed into the three leadership style groupings (resonant, mixed, dissonant). I propose that the difference in slope that exists between the three leadership groupings is the amount of energy that the leader invested in building or maintaining relationships with nurses during times of chaos. This *relational energy* could in fact be conceptualized as the variable that would be on the Z-axis rather than the three groupings of leadership styles (see Figure 3). Resonant leaders would expend the most energy in relationships with their staff and dissonant leaders the least.

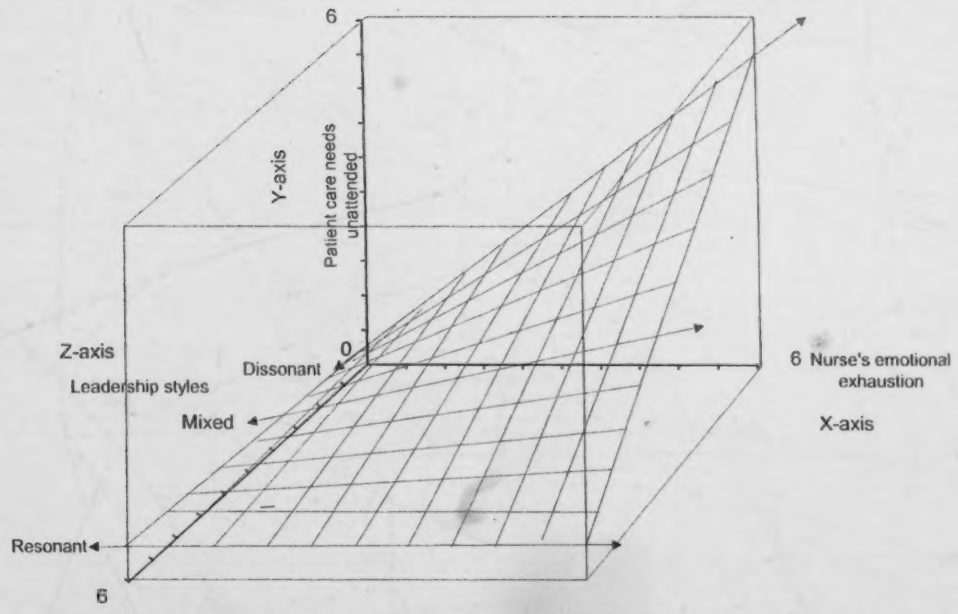

Figure 2b. The impact of nurses' emotional exhaustion on the number of patient care needs left unattended by leadership style groups.

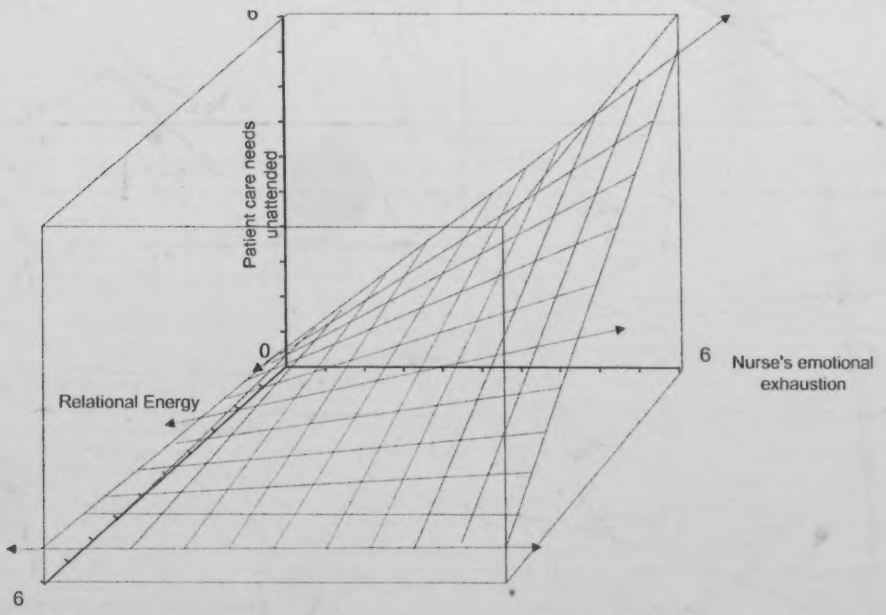

Figure 3. The impact of nurses' emotional exhaustion on the number of patient care needs left unattended, by the degree of relational energy invested by the leader

A theoretical approach to relational energy acting as an adjuvant

In this section, I discuss how relational energy between a leader and a nurse has an impact on the nurse's well being, particularly following adverse events of which hospital restructuring is one example. I will describe how the action of an adjuvant on the immune system is an analogy to how this relational energy might work.

Adjuvant is a term that is used in immunology, animal sciences, oncologic treatment and several other areas. The primary immunologic definition of an adjuvant is a substance that enhances the immune system response to an antigen by stimulating rapid and sustained production of antibodies (www.fsu.edu/~FSULAR/adjuvant.html; July 4, 2003). When an antigen such as a virus or bacteria enters the body, a healthy immune system will recognize the antigen as a foreign intruder and a threat to its integrity, and will develop antibodies to combat the intruder and fight off infection or disease. If an individual is stressed due to work related or personal stress, or both, the immune system's response is weakened and the development of antibodies to combat the antigens is reduced. Hence we appear to suffer more frequent colds when we are stressed and have not taken appropriate wellness measures such as proper handwashing, nutrition or adequate sleep. Adjuvants act to stimulate the immune system to develop antibodies through a variety of mechanisms including enhancing long-term antigen release to increase the length of time that the immune system has to process the antigen, modulating immune response by stimulating immune cells, and by enhancing antigen destruction and disposal after binding with it (http://www.fsu.edu/~FSULAR/adjuvant.html; July 4, 2003). Figure 4 depicts the action of adjuvants on the immune system. Adjuvants can also

increase immune cell ability to recognize cancer cells, or act as forms of treatment that augment first-line therapy (http://www.cancerguide.org/adjuvant.html; July 4, 2003).

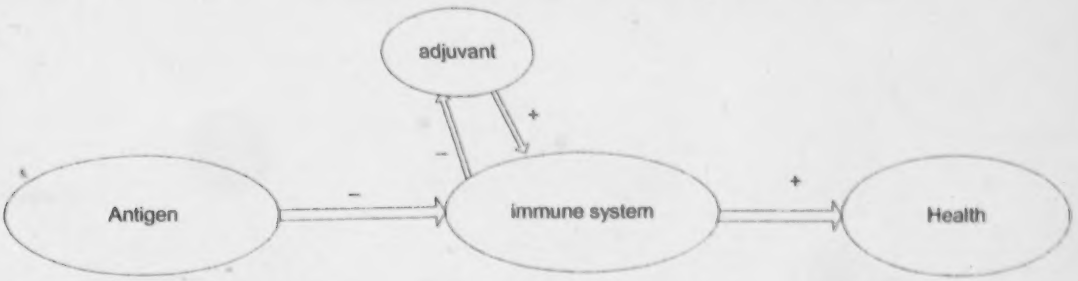

Figure 4. Adjuvant Action on the immune system

How can a model of adjuvant action be applied analogously to these findings?

External restructuring that leads to chaos in the workplace can be seen as the antigen. The workplace stress it produces leads to a reduction in immune system function. The resonant leader's actions to invest relational energy to develop and maintain relationships acts as an adjuvant to stimulate the nurse's coping (immune) system by assisting in the development of a new coherence of meaning that serves to reduce the nurse's work related stress. The emotional resilience of nurses grows, allowing them to focus on meeting the patient's needs despite the ongoing changes in the work environment.

Resonant leadership interrupts the negative loop of unmet care needs and unfulfilled expectations by acting on the nurses' health and well being through the development and/or maintenance of relationships with a focus on the nurse as a person, professional and individual. This is the investment of relational energy, which is present during repeated interactions between the resonant leader and the nurse. These interactions begin with a leader who is visible and accessible, listens and responds to staff concerns,

invests in staff development, manages conflict that could interfere with the nurse's ability to complete work, and empowers the nurse to make important patient care decisions. Each interchange can consist of multiple reciprocal effects, where the nurse and the leader each engage in the interaction and are responsible for the outcome. Figure 5 illustrates a snapshot in time of a leader who spends time listening and

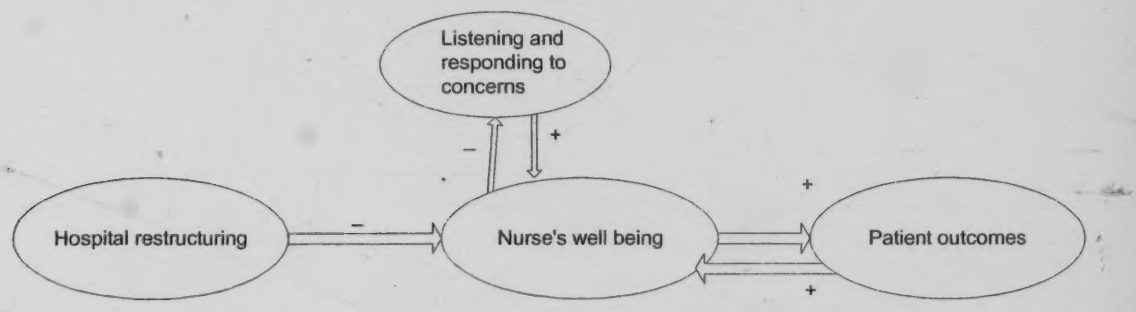

Figure 5. Interaction between the resonant nursing leader and the nurse that mitigates the negative impact of adverse events on nurses.

responding to a nurse's concerns. Foremost, the leader and the nurse must have the opportunity to spend time together in which the nurse can express concerns. The act of expressing concern to the leader helps the nurse to clarify the situation parameters, express why it is a concern and offer potential solutions to the concern. The leader's actions of listening and responding serve to recontextualize the issue within the larger picture of unit or organizational mandates. Collaborating with the nurse to choose the most appropriate of the proposed solutions signals to the nurse that the original concern and the nurse's efforts to resolve it were both valid. These signals allow nurses to construct new meanings about their work, and to bolster their confidence to apply this learning to future situations. Nurses' stress levels are reduced and their well being

improves. The leader leaves the interaction with a sense of accomplishment having assisted a professional staff member to alleviate their stress and achieve their goals. This is the mitigation of effects of adverse events on nurses.

I propose that the rationale for how dissonant nursing leaders affect nurse's well being is due to the lack of supportive relationships between the dissonant leader and the nurse. In figure 6, the interrupted arrow from the nurse to the leader portrays this lack of relationship. The lack of supportive interaction and relational energy between the dissonant nursing leader and the nurse, allowed the nurse's work stress to continue to

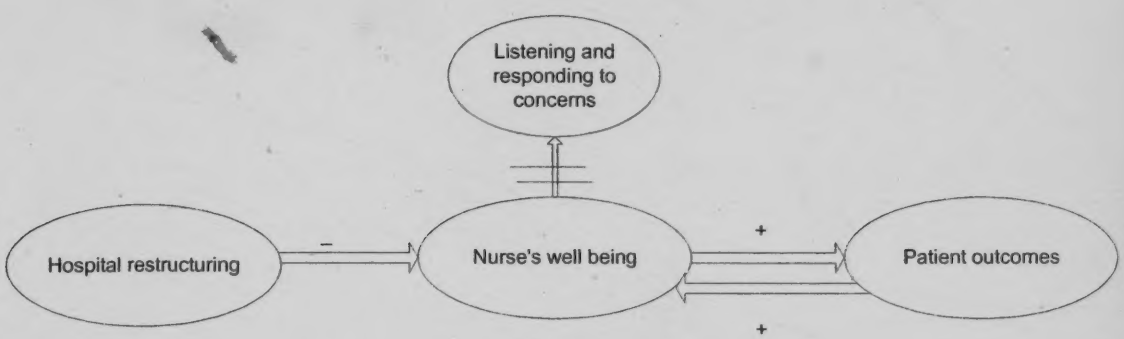

Figure 6. Lack of interaction between the dissonant nursing leader and the nurse

negatively affect patient outcomes. No opportunity for mitigation occurred and the nurse's emotional exhaustion may also have been intensified by frustration over not being heard, thereby augmenting work stress. It is also possible that the intense corporate demands of hospital restructuring may have led some leaders to be perceived as dissonant, if their attention was pulled away from the front line nurses who were left to provide care under difficult circumstances.

Research into leader/follower relationships

Leadership research has largely been categorized into three domains: that which

focuses on the leader, the follower or on the relationship between them (Graen & Uhl-Bien, 1995). Leader-focused approaches centre on individual traits, behaviours or role-based characteristics of leaders. Follower-based approaches include similar characteristics of the follower as well as expectations and role attributes such as empowerment. Relationship-based approaches examine relational characteristics such as trust, respect, mutual obligation and other reciprocal influences between leaders and followers. The latter encompasses leadership that focuses the leader-follower dyad, similar to that which I have been discussing. Over the past thirty years this domain of research has studied effective leadership relationships under the rubric of Leader-Member Exchange (LMX). Early work had begun with the assumption that leaders interacted with all of their followers in a consistent way, based on an Average Leadership Style (ALS) model (Schriesheim, Castro, & Cogliser, 1999). With further theory and research, the notion that leaders discriminate between their followers and interact with them somewhat differently led to the LMX model. A comprehensive review of LMX research by Schriesheim et al (1999) revealed 147 studies that had focused on this leadership domain. Varying definitions of LMX were examined, however six content sub-dimensions were predominant in the majority of studies: mutual support, trust, liking, latitude, attention, and loyalty (Schriesheim et al.). Despite its comprehensiveness, this review did not identify any studies referring to the impact of the leader's emotional intelligence within the leader-member dyad, or to the concept of *relational energy* within this dyad. From 1999 to now, I located two articles that present models of relational leadership. The first model asserted that the LMX relationship was built through interpersonal exchanges which gave both parties the opportunity to evaluate each other's ability, benevolence and

integrity (Brower, Schoorman, & Tan, 2000). The second focused on the reciprocal investment of effort by leaders and followers, leading to high or low quality relationships (Maslyn & Uhl-Bien, 2001). Results of this study concluded that one member of the dyad judged the quality of the relationship to be highest when the partner was perceived to invest the greatest effort into the relationship, and that future effort was greatest when individuals had been in high quality relationships for longer periods of time. These studies in LMX suggest that there is considerable research interest into the effect of the relationships between leaders and followers, yet no studies were found that examined the concept of *relational energy as an adjuvant* as I have proposed in this paper.

One important finding of Schriesheim et al.'s comprehensive review was the need for clearer specification of the level of analysis in this dyad research, particularly as it relates to dyads in groups, independent of groups, or at some other level of analysis (Schriesheim et al., 1999). Of the 147 studies reviewed, only 10 had used techniques appropriate for testing levels-of-analysis effects. This led to the speculation that the level of analysis at which LMX effects operate remains largely unknown and open to debate. This finding along with the challenges I had faced in my earlier leadership research suggests that specific attention to this issue is required in any future research.

Investigating a theory of relational energy as an adjuvant

I propose in future studies to examine the concept of *relational energy* within a LMX framework. The traditional way that the concept of well being has been measured (as in Figures 5 and 6), is as a snapshot in time (the response to a question on a single survey). Even longitudinal research with multiple surveys usually captures a nurse's state of well being in a series of snapshots over a period of years. The challenge for

investigating my proposed theory will be to capture the changes to a nurse's well being at the point of each interaction between the leader and the nurse, as well as, between the nurse and the work environment. These events could occur over a period of minutes, hours or days.

It will also be necessary to model the relationship between the nurse's well being at the first interaction with the leader and that same nurse's well being at the next interaction with the leader and so forth, as these measures of well being should be highly correlated. Figure 7 illustrates one modeling approach that captures the

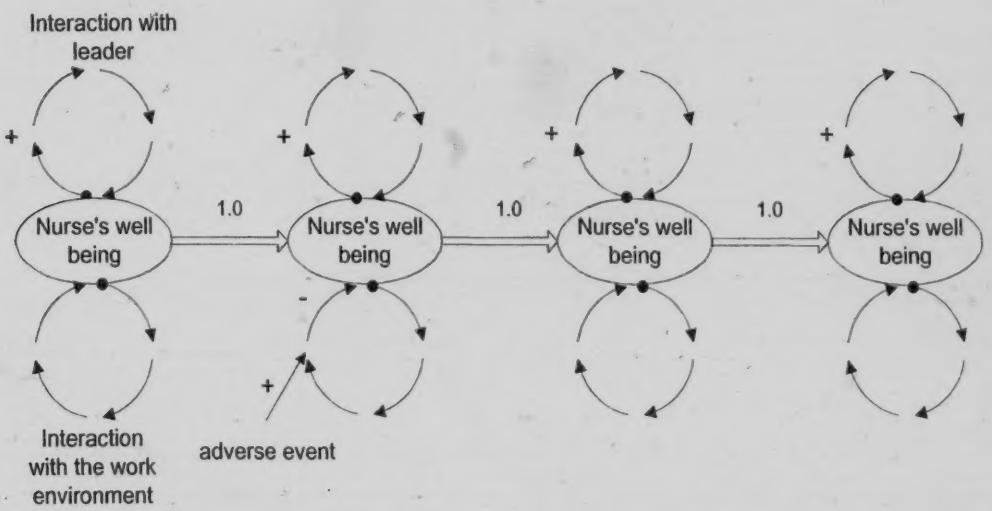

Figure 7. Interactions between the nurse, the nurse's work environment and the resonant leader over time

interactions between the leader and the nurse as a reciprocal effect, allowing for multiple measures of nurse well being, each altered through the exchange with the resonant leader and the nurse's work environment. The interaction of the nurse and the work environment can also be modeled as a reciprocal effect as nurses can effect their work environment as part of a team of colleagues, as well as receive effects from the work environment. It is

through the reciprocal effect of interaction with the work environment that the impact of an adverse event on the nurse's well being can also be modeled. The flow of relational energy between the resonant leader and the nurse serves to enhance the nurse's coping system and thereby his/her well being, counteracting the negative effect of the adverse event.

The absence of relational energy between the dissonant leader and the nurse is theorized to allow the stress of the work environment to negatively affect the nurse's well being, unmitigated. This is modeled in Figure 8. The rationale being that the nurse's coping system is not stimulated by the adjuvant of relational energy from the leader/nurse interaction.

An additional challenge in this research will be to investigate not only the ongoing interactions between the leader and the nurse, but also between the nurse and the workplace environment. While I have used structural equation modeling throughout my doctoral research and have drawn these theoretical models to reflect this thinking, other research methods appropriate to addressing this research question will be investigated. These would include qualitative methods that would access the richness of the interaction between the leader and nurse, the nurse and the work environment and

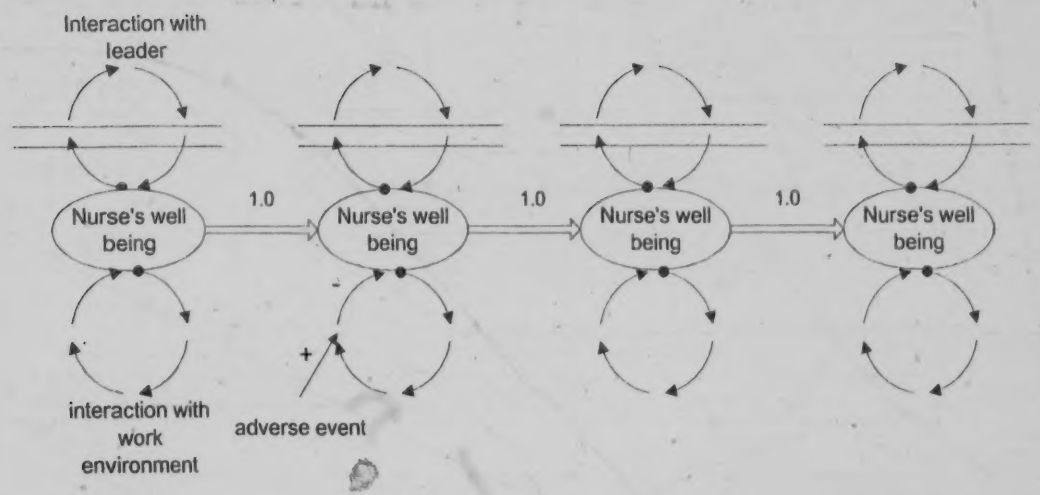

Figure 8. Interactions between the nurse, the nurse's work environment and the dissonant leader over time

the impact of these interactions on all parties. Knowledge generated from this future work will provide new perspectives on these important leader/nurse relationships.

How does this theory of relational energy relate to the discipline of nursing?

The leader-nurse relationship is the core or essence of the nursing leader's practice as a nurse. This relational approach to leadership practice is distinct from the traditional management role that focuses on task completion. The concepts of leadership with a relational focus and management with a task focus are congruent with the priorities characteristic of theoretical resonant and dissonant leadership styles. Both leaders' roles are expected to achieve the mandate of the organization but they differ on how they enact their responsibilities.

In developing a research program of leadership science within nursing, I argue that the phenomenon of interest is the relationship between the nursing leader and the nurse founded on relational energy. What sets this research and the knowledge it will

generate apart from other leader-follower research is the interest in seeking to understand the impact of this relationship on the nurse's ability to effect positive patient outcomes. This phenomenon of interest contributes to the discipline of nursing in that nursing leaders approach their work from the perspective of a nurse, not just from the perspective of a leader. This is not to say that nursing leaders "nurse" their staff; they use their nursing knowledge to develop and maintain relationships with nurses to assist in enabling them to practice to their full potential. In applying nursing knowledge, nursing leaders view their staff as whole persons deserving of respect, understanding that each nurse comes with knowledge, skills and competence to contribute in a wide array of decision making and problem resolution areas. These nursing leaders establish partnering relationships with their nurses in order that collaboratively, they ensure that the needs of patients are met in the goal to restore health. Nurses who are stressed and anxious due to the disruption of meanings arising from adverse events at work, are not in the best position to develop and maintain relationships with patients that support healing and health. Relationships with nursing leaders that mitigate the effects of adverse events are key to the nurse's ongoing health and well being.

This theory development and future research on *relational energy* in the nursing leader-nurse relationship is complimentary to that of nursing theories of Hildegard Peplau and Ida J. Orlando in which their phenomenon of interest was the nurse-patient relationship. Peplau (1997) focused her theoretical work on the *interpersonal relations* of the nurse-client relationship since much of the primary work of nurses occurred during their interaction with patients. Orlando wrote of the *dynamic nurse-patient relationship* in describing the role of the nurse as an autonomous, interpersonal agent who forms helping

relationships with patients, other nurses or other disciplines for problem resolution (Rosenthal, 1996). Recently, Laurent (2000) also suggested that Orlando's work could be applied to the nurse-leader relationship as a *dynamic leader-follower relationship* model, focusing on leadership rather than management. Nursing has frequently had to rely on theory from other disciplines to develop new knowledge especially related to domains such as nursing education or inquiry into the history of nursing. It is time for nursing to embrace nursing leadership as a specialty domain within nursing in order for the science of nursing leadership to flourish. Research that examines as its phenomenon of interest, the relationship between the nursing leader and the nurse is one starting point for this to occur.

Summary

The research into the effects of hospital restructuring is still relatively new, and theory surrounding how nursing leaders can mitigate the effects of hospital restructuring on their nurses is even newer, still in its infancy. I have described my early theorizing, which proposes that the difference in results for nurses who work for resonant and dissonant leaders is based on the degree of relational energy that is invested by the nursing leader into building and maintaining relationships with the nurse. This relational energy acts as an adjuvant to stimulate the nurse's coping response in the face of external forces of change. Nursing leader-nurse relationships allow nurses to develop new meanings from their chaotic environments and to continue to have the emotional health and well being to provide quality care to their patients.

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